Interreg VI – A Italia - Österreich
Cooperation Program 2021 - 2027

Workshop Template – Closing the Loop: Sawdust in a Circular World

Interreg Italia–Österreich

Co-funded by the European Union

EDU-CIRC

Author: Alexander Berndt

Company: CUAS

Date: 16.06.2025

Version: 1.0

DOCUMENT APPROVAL

Name	Organization	Role	Action	Date
Alexander Berndt	CUAS	Lead		

DOCUMENT HISTORY

Version	Date	Modifications	Authors
V1.0	01.08.2025	Initial idea	Gehan Dasanayake
V1.1	09.08.2025	Workshop layout development	Gehan Dasanayake
V1.2	10.08.2025	Workshop activity modification and required equipment updated	Gehan Dasanayake
V1.3	11.08.2025	Added composite material descriptions	Gehan Dasanayake
V1.4			

Index

1. Introduction

The "Closing the Loop: Sawdust in a Circular World" workshop is a half-day program for students, educators, and community members interested in sustainability, circular economy, and hands-on eco-design.

It focuses on upcycling sawdust (a woodworking by-product) into useful biocomposite products using EcoFlex™ silicone and moulds, while exploring Life Cycle Assessment (LCA) and the 9Rs of Circular Economy (CE).

1.1 Learning Objectives

By the end of the workshop, participants will be able to:

- Learn the principles of Circular Economy.
- Understand and apply the 9Rs to a real product challenge.
- Gain practical experience creating bio-composite items.
- Reflect on the environmental trade-offs of materials and processes.

1.2 Required Knowledge

No specialized background is required. However, participants will benefit from:

- Awareness of environmental issues (waste, pollution).
- Basic teamwork and presentation skills.

The workshop is designed to be accessible and engaging for students aged 12–15.

2. Workshop Structure

Table 1 Workshop Structure

Phase	Duration	Activities	Purpose	Materials
Opening	10 min	Welcome participants, Introducing workshop themes	Engage curiosity, set sustainability theme	Slides
Context Setting	TBD	Mini talk: Circular Economy & 9Rs with MDF examples, LCA introduction with sawdust MDF case study	Explain key concepts and link to activity.	Slides, Videos
Main Content	TBD	Safety briefing, hands-on bio-composite making, curing & LCA reflection, poster preparation.	Apply CE and LCA in product creation.	Slides Sawdust, EcoFlex™, molds, PPE, Poster papers

Wrap-up	15 min	Team presentations & awards, feedback & closing.	Consolidate learning, celebrate achievements, gather feedback.	Certificates, feedback forms.

2.1 Workshop Agenda

Table 2 Workshop Agenda

Phase	Duration	Activities	Purpose	Materials
Opening	10 min	Welcome participants, Introducing workshop themes	Engage curiosity, set sustainability theme	Slides, Videos
Context Setting – Circular Economy (CE)	TBD	Mini talk on Circular Economy & 9Rs with MDF/sawdust examples.	Build understanding of CE principles and waste valorization.	Slides
Context Setting – Life Cycle Assessment (LCA)	TBD	Introduction to LCA using MDF from sawdust case study.	Show how LCA measures environmental impacts across life stages.	Slides
Composite Materials	TBD	Introduction to composite materials.	Provide an overview of the hands-on activity with composite materials and their advantages	Slides
Safety Briefing	TBD	PPE demonstration, EcoFlex™ handling instructions, ventilation reminders.	Ensure safe working practices.	Gloves, goggles, paper towels.
Hands-On Production	TBD	Teams mix sawdust with EcoFlex™, pour/press into molds.	Apply CE by turning waste into useful products; think about LCA during making.	Sawdust, EcoFlex™ A/B, molds, mixing tools.
Curing & LCA Reflection	TBD	While products are cured, teams complete LCA tables and note ideas to improve sustainability.	Apply LCA thinking to real-world products; connect theory to practice.	Poster paper, stationary items
Poster Preparation	TBD	Create posters showing product sketches, materials used, LCA stages, and CE benefits.	Communicate sustainability reasoning visually.	Poster paper, stationary items
Team Presentations	TBD	Teams pitch their products and explain CE and LCA considerations.	Share ideas, practice public speaking, inspire peer learning.	Posters, judging sheets.
Review & Awards	TBD	CE innovation, LCA insight, and teamwork.	Celebrate achievement, encourage collaboration.	Certificates, small prizes.

Feedback & Wrap-Up	TBD	Reflection worksheets, group discussion, closing remarks.	Consolidate learning, gather improvement ideas, close the session.	Feedback forms

2.2 Required Equipment

Table 3 Required Equipment

Category	Item	Quantity	Purpose	Alternative Options
Technology	Projector & screen	1 set	Present slides and visuals	Large monitor, flip charts
	Laptop	1 unit	Run presentation and visuals	Tablet with HDMI adapter, shared desktop
	Speakers	1 set	Audio for videos or sound-supported content	Built-in laptop speakers, no-audio option
Materials	Sawdust	~300–400g per team	Raw material for bio-composite product	Wood shavings from local carpenters
	EcoFlex™ Silicone (A & B)	1 kit	Binder for sawdust product making	Other natural resins (e.g., starch-based)
	Silicone molds (various shapes)	1-2 per team	Forming the final products	Recycled containers, custom-made molds
	PPE – Gloves & Goggles	1 set per participant	Safety when handling EcoFlex™ and sawdust	Cloth gloves, reusable eye protection
Supplies	Markers, pens, pencils, erasers	1 set/team	Poster design, calculations, sketching, note-taking	N/A
	Scissors, glue, tape	1 set/team	Assembly of posters and model elements	N/A
	Poster paper	2 sheets/team	Visual presentation of team decisions, CE & LCA strategy	A3/A2 papers
	Mixing cups & sticks	1 set/team	Mixing sawdust with silicone	Reused yogurt cups, wooden stirrers
	Paper towels & cleaning materials	1 set/team	Clean-up during and after activity	Reusable cloths
Documentation	LCA reflection sheets	1 per participant	Recording environmental impact analysis	Digital form (Google Sheets/Forms)
	Evaluation sheets	1 per team	Peer review & judging of final products	Tablet, online survey

Other	Full Slide Deck	1 master set (digital)	Guide participants through the entire workshop visually and clearly	Available via shared drive, USB stick, or printout handouts

2.3 Evaluation Framework

Table 4 Workshop Evaluation

Evaluation Type	Timing	Method	Key Metrics	Follow-up Actions
Immediate	End of workshop	Feedback forms	Satisfaction, objective achievement	Immediate improvements
Short-term	1-2 weeks later	Email survey	Knowledge retention, initial application	Provide additional resources
Long-term	3-6 months later	Interview/survey	Behaviour change, performance impact	Plan follow-up sessions

3. Detailed Explanation

3. Workshop Layout Explanation

3.1. Opening

Activity: Welcome & Icebreaker Quiz on Sawdust/Wood Products

Description:

The facilitator welcomes all participants, introduces themselves, and provides an overview of the day's structure and expected outcomes.

Explain the workshop theme "Closing the Loop: Sawdust in a Circular World" , focus on waste as a resource, upcycling, and product innovation.

Play a short icebreaker quiz: Show images or physical samples of everyday items (e.g., MDF board sample, bamboo board sample, Oak board sample) and ask participants to guess which ones contain sawdust or wood fibers.

Purpose: Create an engaging start, spark curiosity, create a positive atmosphere, and introduce sustainability concepts in a relatable way.

Materials: Slides, wood/sawdust product samples, projector.

3.2. Context Setting – Circular Economy (CE)

Activity: Mini Talk on CE & the 9Rs Framework

Description:

Present the Circular Economy model and compare it to the Linear Economy ("take–make–dispose") with a short video.

Explain the 9Rs (Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover).

Give practical MDF/sawdust examples for each "R" — e.g., Refuse: don't use virgin wood; Repurpose: turn old MDF shelves into decorative wall panels.

Show a visual diagram of the circular loop to make it easy to understand.

Purpose: Build a clear foundation of CE principles and demonstrate how waste streams (like sawdust) can be converted into valuable products.

Materials: CE infographic, 9Rs chart, slides, projector/whiteboard.

3.3. Context Setting – Life Cycle Assessment (LCA)

Activity: Introduction to LCA with MDF from Sawdust Case Study

Description:

Explain what is LCA? A tool for assessing environmental impacts across a product's full life cycle.

Present the five stages: Raw Material Extraction, Manufacturing, Transportation, Use, End-of-Life.

Use MDF from sawdust as the case study, showing actual data on CO_2 emissions, energy use, recyclability, and chemical impacts at each stage.

Emphasize how LCA can guide design choices to lower environmental impact.

Purpose: Ensure students understand how to measure and compare sustainability impacts, preparing them for later analysis of their own product.

Materials: LCA stage posters, comparison charts, sample LCA data sheets, slides.

3.4. Composite Materials

Activity: Introduction to LCA with MDF from Sawdust Case Study

Description:

Composite materials are created by combining two or more components to form a material with unique properties. The matrix holds the material together, while the reinforcement (e.g., fibers, sawdust) adds strength. Composites can be natural (e.g., wood, sawdust) or synthetic (e.g., carbon fiber). The benefits of composite materials include being lightweight, durable, customizable, and sustainable. Biocomposite, made from renewable resources like sawdust, offer environmental benefits. Additionally, their lightweight nature enhances energy efficiency, especially in transportation by reducing fuel consumption.

Purpose: To understand the structure of composite materials and recognize the practical benefits they provide, especially in terms of sustainability, durability, and energy efficiency.

Materials: Slides

3.5. Safety Briefing

Activity: PPE & EcoFlex™ Handling Demonstration

Description:

Show proper use of gloves and goggles.

Demonstrate safe workspace setup: covering tables, keeping ventilation open, handling spills, and washing hands after work.

Never touch eyes or skin after handling materials.

Explain correct mixing of EcoFlex™ Parts A & B (equal parts, quick mixing to avoid premature setting).

Student Activity: Each student practices wearing PPE correctly; teams check each other for compliance.

Purpose: Ensure all participants can work safely and protect themselves during hands-on production.

Materials: Gloves, goggles, paper towels, waste disposal bin.

3.6. Hands-On Production

Activity: Making Bio-Composite Products from Sawdust and EcoFlex™

Description:

Teams receive sawdust, EcoFlex™, mixing cups, stir sticks, and chosen molds.

Step 1: Measure equal amounts of EcoFlex™ Part A & Part B.

Step 2: Mix quickly until uniform.

Step 3: Add sawdust gradually, stirring until a thick paste forms.

Step 4: Pour or press the mixture into molds, smoothing the surface.

Remember teams to think about circular economy (CE) principles and potential environmental impacts as they work.

Student Activity: Students divide roles (mixer, measurer, mold handler, recorder) and collaborate to produce their item.

Purpose: Apply CE principles in a tangible way by transforming waste into a functional product, while considering environmental trade-offs.

Materials: Sawdust, EcoFlex™ A/B, silicone molds, mixing tools, PPE.

3.7. Curing & LCA Reflection

Activity: Product Curing and Impact Analysis

Description:

While products cure (~20–30 minutes), teams complete LCA reflection worksheets.

Record: Raw materials used, manufacturing process, transport impacts, product use, and end-of-life options.

Discuss potential design changes to improve sustainability.

Student Activity: Teams fill out LCA tables together, then share one sustainability improvement idea with the facilitator.

Purpose: Strengthen understanding of LCA and connect theory to practice.

Materials: LCA worksheets, stationery

3.8. Poster Preparation

Activity: Visual Communication of Product & Sustainability Strategy

Description:

Teams create posters including product sketches, list of materials, LCA stages with impacts, CE ideas, and any design trade-offs.

Encourage creative visuals.

Student Activity: Assign roles as designer, writer, presenter etc. to complete the poster efficiently.

Purpose: Develop teamwork, communication skills, and clear sustainability messaging.

Materials: Poster paper, markers.

3.9. Team Presentations

Activity: Product Pitch to Group

Description:

Each team presents their poster and product, explaining:

The idea and purpose of the product.

Circular economy (CE) ideas.

LCA findings and possible improvements.

Allow short Q&A after each pitch.

Student Activity: Presenters practice clear speaking; other team members answer questions.

Purpose: Share knowledge, encourage peer learning, and inspire innovative thinking.

Materials: Posters, slides, evaluation sheets.

3.10. Review & Awards

Activity: Peer Review and Recognition

Description:

Teams and facilitators score each presentation for creativity, CE innovation, LCA insight, and teamwork.

Present small awards in each category (e.g., Most Creative Design, Best LCA Reflection).

Student Activity: Students score peers and celebrate winners.

Purpose: Recognize achievement and reinforce learning in a fun way.

Materials: Scorecards, certificates, small awards.

3.11. Feedback & Wrap-Up

Activity: Reflection and Closing Session

Description:

Students complete feedback forms and a short reflection worksheet ("One thing I learned, one thing I'll do differently").

Group discussion to share key takeaways.

Closing remarks from facilitator and group photo.

Student Activity: Individual feedback submission

Purpose: Consolidate learning, collect improvement ideas, and end the workshop positively.

Materials: Feedback forms

Equipment & Purchasing Links

1. Molds for student activity
   - https://www.amazon.de/Sukkulente-Silikonform-Blumentopf-Gie%C3%9Fform-Sukkulenten/dp/B0CT5F2B57?th=1
   - https://www.amazon.de/Silikonform-Reagenzglas-Epoxidharzform-Vasenanordnung-Hydroponische/dp/B09TJ84X1F
   - https://www.amazon.de/Hejo-Silikonform-Silikonformen-Betonformen-Herstellung/dp/B0DXTB62VW?language=en_GB&currency=EUR
   - 3D Printed Molds

2. Eco Flex 0020
   - https://www.kaupo.de/shop/SILIKONKAUTSCHUK-addition/ECOFLEX-SERIE/Ecoflex-00-20/ECO-FLEX-0020-1-Silikonkautschuk.html

3. Safety Equipment (PPE)
   - Safety Goggles
   - Safety Gloves
   - Cleaning tissues

4. Wood Samples (Can also use the samples purchased for workshop: Pupil: From tree to table)
   - Purchase Link for Wood Samples

Item No.	Material Name	Thickness (mm)	Width (mm)	Length (mm)	Quantity (pieces)
1	MDF Fire Retardant Oak Mix Veneer	20	50	300	2
2	Bamboo Caramel 3L Side Pressed	20	50	300	2
3	Solid Three Layers Panel Oak Rustic	20	50	300	2