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Workshop Template – Carbon Free Carpentry : Circular Boats

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DOCUMENT APPROVAL

Name	Organization	Role	Action	Date
Alexander Berndt	CUAS	Lead		

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V1.1	21.08.2025	Workshop layout and activity development	Gehan Dasanayake
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V1.4			

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1. Introduction

The “Carbon-Free Carpentry: Circular Boats” workshop is a 3-hour program for pupils (12–14 years) to learn about sustainability, circular economy, and life cycle assessment (LCA) through building a wooden boat kit.

It combines theory (CE & LCA) with a hands-on activity (Material Passport + boat building) and group reflection.

1.1 Learning Objectives

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

- Learn the principles of the Circular Economy (CE).
- Understand and apply Life Cycle Assessment (LCA).
- Build a small wooden boat using a sustainable wood kit.
- Use a Material Passport to analyze the product’s journey.
- Reflect on carbon impacts and propose circular design improvements.

1.2 Required Knowledge

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

- Basic teamwork & presentation skills.
- General awareness of environmental issues (waste, recycling, climate change).

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

2. Workshop Structure

Table 1 Workshop Structure

Phase	Duration	Activities	Purpose	Materials
Opening	10 min	Welcome participants, Introducing workshop themes + icebreaker quiz (wood & carbon)	Engage curiosity, set sustainability theme	Slides
Context Setting	TBD	CE & LCA intro (Linear vs Circular economy, simplified wood life cycle)	Build understanding of CE & LCA concepts	Slides, Videos
Main Content	TBD	Show Example Passport Story, Safety briefing, teams open kits, discover their passport story, build boats	Apply CE and LCA while product creation.	Slides Boat kits, PPE, worksheets
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 + icebreaker quiz (wood & carbon)	Engage curiosity, set sustainability theme	Slides, Videos
Context Setting – Circular Economy (CE)	TBD	Circular Economy Introduction	Build understanding of CE principles	Slides
Context Setting – Life Cycle Assessment (LCA)	TBD	Introduction to LCA and provide real world examples	Show how LCA measures environmental impacts across wood life stages. Improve understanding each stage with real world scenarios	Slides
Passport Overview	TBD	Show Example Passport Story + explaining filling instructions	Prepare pupils for main activity	Slides
Safety Briefing	TBD	PPE demonstration, tool handling instructions	Ensure safe working practices.	Gloves, paper towels.
Hands-On Activity	TBD	Teams open kits, discover their passport story, build boats, fill worksheets.	Apply CE + LCA thinking while making	Kits (material passports need to be included inside the kit), tools, PPE, worksheets
Poster Preparation	TBD	Create posters showing passport story and answer the given questions	Communicate sustainability reasoning. Connect product to carbon impacts	Poster paper, stationary items
Team Presentations	TBD	Each group presents: Boat + Passport Story + Improvement Idea	Share ideas, practice public speaking, inspire peer learning.	Posters, judging sheets.
Review & Awards	TBD	Creative designs, LCA and CE insights, 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	Wooden boat kits (with passport)	1 kit/team	Boat kit for student activity	NA
	PPE gloves (cut resistant)	1 set per participant	Safety when handling sharp tools	NA
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
	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

Description:

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

The workshop begins with a focus on the theme of wood. Participants learn about the principles of the Circular Economy and how to evaluate environmental impact using a Life Cycle Assessment.

The main activity is to build and evaluate a model wooden boat and then reflect on how to improve its design and sustainability.

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

Materials: Slides

3.2. Context Setting – Circular Economy (CE)

Activity: Introduction to CE

Description:

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

The importance of the Circular Economy is highlighted by its environmental benefits (reducing waste, pollution, and resource depletion).

Purpose: Build a clear foundation of CE principles and explain why it is important.

Materials: Slides

3.3. Context Setting – Life Cycle Assessment (LCA)

Activity: Introduction to LCA

Description:

This part introduces Life Cycle Assessment (LCA) as a method for assessing a product's environmental impacts throughout its entire life cycle. The purpose of LCA is to help identify areas where the environmental footprint can be reduced and to guide design choices for more sustainable products. The simplified life cycle of wood is presented, including raw material (e.g., tropical hardwood), transport (e.g., cargo ship + truck), use (e.g., furniture), and end of life (e.g., reuse, landfilling, or burning).

Wood
Choose materials with low embodied carbon and long service life. Reclaimed wood or responsibly managed wood such as FSC certified options are preferable to virgin timber sourced from far away. Keep parts single material wherever possible, keep processing simple such as sawn and air dried, and favor mechanical joints so future recovery remains possible.

Transport
Reduce distance and weight moved and pick cleaner modes. Source nearby so local pickup or short regional trucking replaces long ocean shipping followed by long trucking or air freight. Plan fewer trips with fuller loads and coordinate deliveries so transport emissions remain small relative to the building.

Use
Design for durability and easy repair. Rely on standard screws, pegs, and wedges, include replaceable wear parts, and write a short care plan that covers cleaning, retightening, and re oiling. Longer service life lowers carbon per year, while glued assemblies that are not repairable often lead to early disposal.

End of life

Plan disassembly from day one so parts can be reused, remanufactured, or composted if finishes are clean. Label materials clearly and keep them separable to make recovery practical. Avoid landfill and incineration by setting defined routes for each part and by keeping hardware and coatings easy to remove.

Purpose: To teach participants how to evaluate the environmental impact of a product by assessing its life cycle with examples.

Materials: Slides.

3.4. Passport Overview

Activity: Introduction to LCA and CE activity

Description:

Participants are introduced to the concept of a "Material Passport," which documents the journey of their boat's materials. They are shown an example of a passport story for a boat made from fast-growing bamboo, transported locally, and then reused at the end of its life as garden steaks. The

passport helps them think about their wood's journey and whether it is linear or circular. An example demonstrates a "semi-circular economy" approach with a "medium-low carbon" impact.

Purpose: To prepare participants for the main activity by showing them how to document their boat's journey and analyze its sustainability.

Materials: Slides

3.5. Safety Briefing

Activity: PPE and Handling Demonstration

Description:

A safety briefing is conducted to ensure participants work safely. Key instructions include always wearing cut-resistant gloves and cutting away from one's body and fingers. Participants are also instructed never to point sharp tools at themselves or others.

Purpose: To ensure the safety of all participants during the hands-on carving activity.

Materials: Gloves, paper towels, waste disposal bin.

3.6. Hands-On Activity

Activity: Making the Boat

Description:

Participants receive a complete carving set and a material passport. Their objective is to build a model wooden boat. As they build, they fill out the material passport, documenting the boat's material origin, transport, use, and end-of-life. They also add notes on how the boat's circularity could be improved.

Purpose: To apply the principles of Circular Economy and Life Cycle Assessment by building a physical product and documenting its life cycle.

Materials: Carving Complete Sets, Material Passports, and safety equipment

3.7. Poster Preparation

Activity: Visual Communication of Product & Sustainability Strategy

Description:

Participants prepare for their presentations by finalizing their finished boat, their passport story (identifying whether it is linear or circular), and brainstorming one idea to further improve its sustainability.

Purpose: To prepare the teams for their presentations by summarizing their findings and thinking critically about improvements in sustainability.

Materials: The finished boats and completed passport stories.

3.8. Team Presentations

Activity: Product Pitch to Group

Description:

Each team presents their finished boat, their passport story, and an idea for improving the boat's sustainability.

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

Materials: Finished boats, passport stories, and presentation aids.

3.9. Review & Awards

Activity: Awards

Description:

Awards are given out to recognize the teams' efforts. Categories include "Most Creative Design," "Best Team Collaboration," and "Most Innovative Circular Economy Idea".

Purpose: To celebrate participants' achievements and encourage collaboration and innovation.

Materials: Awards and certificates.

3.10. Feedback & Wrap-Up

Activity: Reflection and Closing Session

Description:

The workshop concludes with a discussion where participants can ask questions about the LCA and CE concepts and share their ideas for improving the activity or their product. A final challenge is posed: "If you could replace boat deck (wood) with another material, what would you choose and why?". The final message is to continue thinking about trees, materials, and the planet.

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

Materials: Feedback forms

Equipment & Purchasing Links

1. Boat kit for student activity
    - https://www.kosmos.de/de/schnitzen-komplett-set_1604608_4002051604608
2. Safety Equipment (PPE)
    - Safety Gloves (cut resistant)
    - Cleaning tissues