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Workshop Template – The Journey of a Juice Box

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Author: Alexander Berndt

Company: CUAS

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DOCUMENT APPROVAL

Name	Organization	Role	Action	Date
Alexander Berndt	CUAS	Lead		

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1. Introduction

The "Journey of a Juice Box: A Circular Economy Workshop" is a program specifically designed for students who are interested in sustainability, circular economy, and hands-on eco-design. The workshop focuses on recycling and upcycling aseptic cardboard containers (juice boxes) while exploring the Life Cycle Assessment (LCA) and the 9Rs of the 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 with recycling layers of a juice box.
- Evaluate the environmental impact of a product through Life Cycle Assessment (LCA).

1.2 Required Knowledge

No specialized background is required. However, participants will benefit from an awareness of environmental issues like waste and pollution. The workshop is designed to be accessible and engaging.

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 aseptic packaging examples, LCA introduction with juice box case study	Explain key concepts and link to activity.	Slides, Videos
Main Content	TBD	Safety briefing, hands-on activity: paper recycling, LCA reflection & poster preparation.	Apply CE and LCA in product creation.	Slides Material required for hands on activity
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
Context Setting – Circular Economy (CE)	TBD	Mini talk on Circular Economy & 9Rs with juice box examples.	Build understanding of CE principles and waste valorization.	Slides
Context Setting – Life Cycle Assessment (LCA)	TBD	Introduction to LCA using a juice box case study.	Show how LCA measures environmental impacts across life stages.	Slides
Aseptic Materials	TBD	Introduction to the layers of an aseptic cardboard container	Provide an overview of the hands-on activity with materials and their advantages	Slides, Videos
Hands-On Production	TBD	Teams make recycled papers from juice boxes	Apply CE by turning waste into useful products; think about LCA during making.	Empty beverage cartons, warm water, mixer
Curing & LCA Reflection	TBD	While pulp is draining, 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	Empty beverage cartons	~3 - 4 per team	Raw material for hands-on activity	NA
	Warm water	1-2 L per team	To soak the carton pieces	Hot water from tap/ Electric Kettle
	Mixer	1 per team	To create pulp from the paper layer	NA
	Tray and sieve	1 per team	Separate pulp from other materials	NA
	Mold frame with mesh	1-2 per team	Create thin layer of pump to make the recycled paper	NA
	Iron	1 per team	Remove excess water and quickly dry the pulp	NA
	Paper towels & cleaning materials	1 set/team	Clean-up during and after activity	Reusable cloths
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
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 and Icebreaker Quiz on Juice Box Materials

Description:

The facilitator will welcome all participants and provide a brief overview of the day's structure. The session will begin with a short, engaging icebreaker quiz to introduce the central theme of the workshop: the various materials that make up a juice box.

This will lead into the main workshop theme, "The Journey of a Juice Box," which focuses on exploring how everyday waste, like juice boxes, can be seen as a valuable resource within a circular economy.

The facilitator will set the stage by emphasizing the hands-on and creative nature of the workshop, highlighting its connection to sustainability and eco-design.

Purpose: To 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: Mini Talk on CE & the 9Rs Framework

Description:

The facilitator will present the Circular Economy model, explaining how it differs from the traditional Linear Economy (take-make-dispose). They will introduce the 9Rs framework (Refuse, Rethink, Reduce, Reuse, Remanufacture, Repurpose, Recycle, Recover), providing practical examples related to the juice box to help participants understand how these principles can be applied to a real product.

Purpose: To build a foundational understanding of the Circular Economy and the 9Rs framework, connecting these abstract concepts to a tangible, real-world product.

Materials: Slides, projector/whiteboard.

3.3. Context Setting – Life Cycle Assessment (LCA)

Activity: Introduction to LCA with a Juice Box Case Study.

Description:

Participants will learn about Life Cycle Assessment (LCA), a method for evaluating a product's environmental impacts throughout its entire life cycle. The five stages of LCA (Raw Material Extraction, Manufacturing, Transportation & Distribution, Use, and Disposal/Recycling) will be presented using a juice box as a case study to illustrate how environmental impact is measured at each step.

Purpose: To teach participants how to evaluate the environmental impact of products and processes, providing them with a systematic tool to analyze sustainability.

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

3.4. The Juice Box

Activity: Introduction to the layers of an aseptic cardboard container.

Description:

The facilitator will give an in-depth overview of the materials that make up an aseptic cardboard container (a juice box), showing how its multi-layered design keeps products fresh. This segment will use visuals to explain the role of each layer (e.g., paperboard for stability, plastic for liquid integrity, and aluminum foil for oxygen barriers) to prepare for the hands-on activity.

Purpose: To provide a material overview that serves as the foundation for the hands-on activity, making the scientific and engineering aspects of the product clear.

Materials: Slides

3.5. Hands-On Production

Activity: Teams separate juice box layers to create recycled paper.

Description:

Working in teams, participants will engage in the core activity: separating the different layers of a juice box. They will use scissors to cut the cartons into small pieces, soak them in warm water, and use a mixer to create a paper pulp. This hands-on process allows participants to apply the principles of the Circular Economy by turning waste into a new product.

Purpose: To provide a practical, hands-on application of circular economy principles, allowing participants to directly experience the process of turning waste into a new resource.

Materials: Mixer, Warm water, Tray and sieve, Mold frame with mesh, Scissors, Iron, Kitchen towels

3.6. Curing & LCA Reflection

Activity: Teams complete LCA tables and note ideas to improve sustainability.

Description:

While the paper pulp is draining and drying, teams will complete LCA reflection tables. This activity links the theory of LCA to the practical experience of the hands-on challenge. Teams will analyze the environmental impacts of their upcycling process and brainstorm ideas to further improve the sustainability of their new product.

Purpose: To connect theoretical knowledge (LCA) with practical experience, encouraging critical thinking and problem-solving related to sustainability.

Materials:

3.7. Poster Preparation

Activity: Create posters showing product sketches, materials used, LCA stages, and CE benefits.

Description:

Each team will design a poster to visually communicate their project. The poster will include sketches of their final product, details about the materials used, their completed LCA tables, and a summary of how their project demonstrates the benefits of the Circular Economy.

Purpose: To facilitate the communication of complex ideas in a clear, visual format, helping teams synthesize their learning and prepare for their presentations.

Materials:

3.8. Team Presentations

Activity: Teams pitch their products and explain CE and LCA considerations.

Description:

Teams will present their posters and their recycled paper products to the group. They will pitch their final product and explain how they applied the concepts of the Circular Economy and Life Cycle Assessment to their project, sharing their insights and ideas.

Purpose: To encourage public speaking, teamwork, and the sharing of ideas, fostering a collaborative learning environment.

Materials: Posters, slides, evaluation sheets.

3.9. Review & Awards

Activity: Awards for CE innovation, LCA insight, and teamwork.

Description:

The workshop concludes with a review and awards ceremony. Recognition is given for "Best LCA Reflection," "Best Team Collaboration," and "Most Innovative Circular Economy Idea." This celebrates participants' achievements, encourages collaboration, and reinforces the key learning outcomes.

Purpose: To celebrate participant achievements, recognize creative and insightful work, and reinforce key learning outcomes in a celebratory way.

Materials: Certificates, small awards.

3.10. Feedback & Wrap-Up

Activity: Reflection worksheets, group discussion, closing remarks.

Description:

Participants will complete feedback forms and engage in a final group discussion to share their key takeaways. The facilitator will provide closing remarks, consolidating the day's learning and encouraging participants to continue thinking about sustainability and their role as "Eco Designers."

Purpose: To consolidate learning, gather valuable feedback for future improvements, and provide a positive and reflective end to the session.

Materials: Feedback forms

Equipment & Purchasing Links

1. Mixer : Make paper pulp
2. Kettle : for warm water
3. Tray and sieve: Link
4. Mold frame with mesh: Link
5. Scissors
6. Iron
7. Kitchen towels