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Workshop Template – Brick to Brick: The Circular Build

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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	12.08.2025	Workshop agenda and layout development	Gehan Dasanayake
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V1.3			
V1.4			

Index

1. Introduction

In this hands-on session, pupils will explore how construction can become more sustainable through circular design. Using reusable mini bricks and water-soluble mortar, they will build, disassemble, and rebuild structures, learning how materials can stay in use instead of becoming waste. Along the way, they'll discover circular economy principles, life cycle thinking, and creative ways to design for disassembly. This workshop turns pupils into problem-solvers for a more circular future in construction.

1.1 Learning Objectives

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

- Understand the Circular Economy (CE) principle of keeping materials in use.
- See design for disassembly.
- Recognize environmental benefits through Life Cycle Assessment (LCA) thinking.
- Brainstorm real-world reusable building solutions.

1.2 Required Knowledge

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

- Basic understanding of how buildings use bricks (e.g., walls, structures)
- Awareness of what happens to materials after demolition (e.g., waste, landfill)
- Familiarity with the concept of waste and recycling
- General awareness of environmental issues (e.g., pollution, climate change)
- No prior knowledge of circular economy or LCA is needed, these will be introduced during the workshop

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, icebreaker: "What happens to bricks after demolition?"	Engage curiosity, introduce reuse and circular economic ideas	Slides
Context Setting	TBD	Mini talk: Circular Economy, LCA basics, cement vs reusable mortar, CE examples	Explain key CE/LCA concepts and connect to real construction practices	Slides, Videos
Main Content	TBD	Safety briefing, hands-on building: Wall → Disassembly → House rebuild, Brick Recovery Percentage, Innovation Challenge	Apply CE in action, experience reuse, design for disassembly	Teifoc kits, water trays, towels, PPE, worksheets

Wrap-up	15 min	Team presentations & awards, feedback & closing.	Consolidate learning, share CE ideas, reflect on experience	Certificates, feedback forms.

2.1 Workshop Agenda

Table 2 Workshop Agenda

Phase	Duration	Activities	Purpose	Materials
Opening	10 min	Welcome participants, icebreaker: "What happens to bricks after demolition?"	Engage curiosity, set sustainability theme	Slides, Video
Context Setting – Circular Economy (CE)	TBD	Mini talk on CE, 9Rs, and Examples from the building industry; importance of reuse over waste	Build understanding of CE principles and rethink building waste	Slides, Video
Context Setting – Life Cycle Assessment (LCA)	TBD	Explain LCA stages with a focus on bricks.	Show how reuse reduces environmental impact across life stages	Slides, Video
Materials & Method Introduction	TBD	Overview of reusable mini bricks and water-soluble mortar (Teifoc), demo correct mortar mixing	Familiarize pupils with tools and prepare for hands-on activity	Demo set, Teifoc kit, mortar mixing items
Safety Briefing	TBD	PPE demonstration, handling instructions.	Ensure safe working practices.	Gloves, paper towels.
Hands-On Activity 1: Build Wall	TBD	Teams build a 6×4×1 brick wall using water-soluble mortar	Apply CE through careful building; design for future disassembly	Teifoc kits, mortars, bowls, paper towels
Activity 2: Disassembly & Innovation Challenge	TBD	Teams soak and disassemble walls to recover bricks; brainstorm real-world disassembly innovations	Experience reuse; develop ideas for circular construction solutions	Water trays, cleaning brush, towels,
Activity 3: Rebuild with Recovered Bricks	TBD	Use recovered bricks to build a new creative structure (e.g., house, castle)	Show how materials can be repurposed without waste	Cleaned bricks, mortar, paper towels
Reflection & Recovery %	TBD	Calculate Brick Recovery %, discuss what made recovery easier or harder	Connect hands-on outcomes with CE measurement	Worksheets, calculators

Poster Preparation	TBD	Create posters showing 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. Each group presents wall–recovery–house journey, reuse ideas, and Brick Recovery %	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	Teifoc Construction accessory set	1 set/team	Biulding activity	N/A
	Cleaning brushes	1 set/team	Clean mortar on bricks	Toothbrush
	PPE – Gloves	1 set per participant	Safety when handling mortar	Clothe gloves
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 mortar with water	Reused yogurt cups, wooden stirrers
	Paper towels & cleaning materials	1 set/team	Clean-up during and after activity	Reusable cloths
Documentation	Evaluation sheets	1 per team	Peer review & judging of final products	Tablet, online survey
	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, CE, 9Rs & Real Examples from Construction

Description:

The facilitator welcomes participants, briefly introduces themselves and the workshop, and outlines the schedule and learning objectives.

Show a short video about brick demolition. Then interactive icebreaker invites pupils to answer: “What do you think happens to bricks when buildings are demolished?” Responses (e.g., landfill, crushed, reused) are written on the board. This stimulates critical thinking around current practices and sets up the shift to circular alternatives.

The facilitator frames the session as a journey from linear to circular thinking in construction.

Purpose: Engage curiosity, activate prior knowledge, and set the context for learning about sustainable building.

Materials: Slides, videos of demolition and reuse scenarios, projector.

3.2. Context Setting – Circular Economy (CE)

Activity: Mini Talk on CE & the 9Rs Framework

Description:

The facilitator explains the concept of the Circular Economy using the 9Rs hierarchy (Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover).

Real-world examples from the construction sector are used to demonstrate how circular principles are applied or often ignore traditional building methods.

Pupils are asked to consider why most materials are wasted during demolition and how buildings could be designed for reuse.

Purpose: Build foundational knowledge of CE; challenge the linear "make-use-dispose" model; encourage rethinking design and demolition.

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

3.3. Context Setting – Life Cycle Assessment (LCA)

Activity: LCA Introduction Using Bricks as a Case Study

Description:

An overview of LCA is presented, breaking down the stages: material extraction, manufacturing, transport, use, and end-of-life.

Pupils explore the environmental cost of a typical clay brick compared to a reused one. A simplified case study shows how reuse shortens the cycle and reduces emissions.

Pupils brainstorm: "Which stages are skipped if we reuse the brick?"

Purpose: Develop understanding of environmental impact through product lifecycles; reinforce reuse as a strategy for lowering emissions.

Materials: Slides, simplified LCA diagrams.

3.4. Materials & Method Introduction

Activity: Teifoc Bricks & Water

Description:

Pupils are introduced to the tools they'll use reusable Teifoc mini bricks and water-soluble mortar. The facilitator demonstrates how to mix the mortar to the right consistency and apply it evenly.

The importance of using minimal mortar is stressed, as it affects how easily bricks can be recovered later. Correct use of tools, workspace hygiene, and sharing within teams are emphasized.

Purpose: Familiarize pupils with tools and materials before the building; reinforce the value of building for disassembly.

Materials: Teifoc kits (bricks, towels), mixing bowls

3.5. Safety Briefing

Activity: Safety Instructions and Best Practices

Description:

A short but essential safety overview ensures pupils know how to handle tools, bricks, and water responsibly. PPE like aprons or goggles is discussed, especially in managing mortar splashes or slippery floors. Emphasis is placed on working calmly, communicating with teammates, and keeping the area clean to avoid accidents.

Purpose: Create a safe and respectful working environment where creativity and learning can happen without risk.

Materials: Gloves, paper towels.

3.6. Hands-On Activity 1: Build Wall

Activity: Team Construction of 6×4×1 Brick Wall

Description:
Teams (3–5 pupils) build a wall structure following size instructions. The process teaches teamwork, attention to detail, and mindful material use. Facilitators move between groups, asking guiding questions such as: “How would you take this apart later?” and “What if this were built with cement?” Pupils are encouraged to think like circular designers during building.

Purpose: Apply CE principles in a hands-on way; understand design-for-disassembly through experience.

Materials: Teifoc kits, mortar, mixing tools, trays or boards to build on

3.7. Activity 2: Disassembly & Innovation Challenge

Activity: Recover Bricks & Brainstorm Real-World Solutions

Description:
After the mortar cures slightly, pupils gently soak their walls in trays to loosen the bricks. Each team carefully disassembles their wall, trying to recover as many whole bricks as possible. While soaking happens, teams brainstorm real-world ideas for disassembling real bricks — examples include lime mortar, bolt-together bricks, or reversible adhesives.

Purpose: Show that reuse is possible with better design; connect play to innovation; promote problem-solving.

Materials: Water trays, towels, cleaning brushes

3.8. Activity 3: Rebuild with Recovered Bricks (House, Castle, Church)

Activity: Creative Build Using Reclaimed Materials

Description:
Teams now reuse the cleaned bricks to build a new structure — a small house, garden, or any imaginative construction. This activity promotes adaptive reuse, showing how materials can serve multiple lives. Pupils are free to decorate or adapt designs, fostering creativity.

Purpose: Reinforce the idea that reused materials can still be functional, strong, and beautiful.

Materials: Cleaned bricks, mortar, building trays, optional props (e.g., flags, toy furniture)

3.9. Reflection & Recovery %

Activity: Brick Recovery Calculation & Discussion

Description:
Using the Brick Recovery % formula, pupils calculate how many bricks they recovered undamaged. They record their data and discuss what factors helped or hindered success (e.g., too much mortar, rough handling). The connection to real construction efficiency is made.

Purpose: Quantify circular success; connect math and science to sustainability concepts.

Materials: Worksheets, calculators or scratch paper

3.10. Poster Preparation

Activity: Visual Storytelling of the CE Journey

Description:
Each team creates a poster summarizing their workshop journey: wall-building, brick recovery, reuse structure, and their innovation idea. Posters must include recovery %, LCA stage impact, and CE benefits. Facilitators help pupils turn ideas into clear visuals and messages.

Purpose: Reinforce learning through visual communication; support knowledge retention and teamwork.

Materials: Poster paper, markers, glue, scissors, images or templates

3.11. Team Presentations

Activity: Group Presentations to Class or Judges

Description:
Teams present their poster and structures to the group, roleplaying as construction companies pitching to a “City Council” (the class or guests). They describe their process, brick recovery score, and how their idea supports circular building. Applause and peer questions follow each presentation.

Purpose: Build confidence, consolidate understanding, and inspire collective learning.

Materials: Poster paper, stationary items

3.12. 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).

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

Materials: Scorecards, certificates, small awards.

3.13. Feedback & Wrap-Up

Activity: Reflection and Closing Session

Description:

Pupils 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.

Pupils Activity: Individual feedback submission

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

Materials: Feedback forms

Equipment & Purchasing Links

1. Brick kit for activity (House, Castle, Church)
    - https://www.teifoc.de/en/products/
2. Cleaning Brushes
3. Water baskets
4. Safety Equipment (PPE)
    - Safety Gloves
    - Cleaning tissues