

LESSON PLAN

Circular Packaging: The Plastic-Free Delivery Dilemma

Age Level: 12-18

Duration: 8-10 hours of lessons

Role of teacher: Coaching, guiding, moderating

Role of student: Taking agency, acquiring knowledge and skills, collaborating, reflecting

Learning objectives:

- Understand the economic principles of the Circular Economy, and how they apply to packaging, logistics and refill systems.
- Identify the challenges and trade-offs businesses face when trying to eliminate single-use plastic (e.g. protecting fragile goods, managing high-volume refill logistics).
- Develop critical thinking, collaborative problem-solving, and empathy skills.
- Produce a proposal based on evidence, research, and analysis.
- Present and refine a final solution after feedback.

Skills development:

- Critical thinking
- Exploratory investigation
- Empathy

Nb: Teachers can explore the Teacher Training on Skills [HERE](#) to select those most appropriate.

Material needed:

- Large paper/poster boards, markers, and post-its
- Laptops or tablets
- Sample packaging materials (e.g. a glass bottle, cardboard filler, a refill container) - optional, if available
- Projector for videos/slides

Relevant YSC Knowledge Pills:

- Urban Circular Economy: Strategies for Minimising Waste and Maximising Resource Efficiency in Cities (youngsmartcities.com/learn/urban-circular-economy) - includes the Oway case study (Bologna), a real, plastic-free glass/aluminium packaging company closely mirroring this Learning Situation's scenario.

Didactic objective of lessons:

Lessons	Phase	Didactic objective
Lesson 1	Explore	Engage students in the topic by exploring their prior knowledge and assumptions about

		packaging and waste, introducing key circular economy concepts through the Knowledge Pill(s), and ensuring everyone reaches a shared foundational understanding of the subject.
Lesson 2-6	Research, Analyse, and Ideate	Guide students to identify what empirical evidence is needed, collect and analyse it, and use their findings to develop feasible, sustainable, and beneficial circular packaging proposals for their city.
Lesson 7-8	Present, Feedback, Reflect	Support students as they present their proposals, gather feedback from peers, experts or stakeholders, and reflect critically to refine and improve their final products.

Nb: timeline is flexible

Problem-Oriented Learning Situation on Circular Packaging

Driving Question:

How can a plastic-free company safely deliver fragile glass products and manage high-volume refills without compromising its environmental values?

Scenario:

A sustainable local company in your city sells liquid soaps and cleaning products in glass bottles and has committed itself to being 100% plastic-free. Customers strongly support the company's environmental values - but two important challenges remain unresolved: protecting fragile glass bottles during e-commerce deliveries without relying on bulky cardboard and paper fillers, and moving away from the industrial plastic containers currently used to supply its in-store refill stations. The company has launched a “Design for Circularity” challenge, inviting students to rethink how liquids, containers and packaging could move through a city, and beyond, without generating unnecessary waste or relying on single-use plastics.

Task:

Students investigate packaging and resource flows in their local context and explore how everyday products could become part of a more circular urban economy. Working in groups, they select one packaging challenge, product category or circular system and develop a realistic, evidence-based proposal that responds to the Driving Question, combining environmental responsibility, practical implementation and the principles of the Circular Economy.

LESSON OUTLINE

LESSON 1: Explore (1 lesson)

Introduction to Circular Packaging (1 lesson)

Objective: Students build a shared understanding of packaging waste, the principles of the Circular Economy, and their current role in the city's economy, while acquiring foundational knowledge needed for research.

Opening Discussion

Teacher Action:

- Ask: “What happens to packaging after we use it?”
- Record keywords emphasising circular economy principles (reuse, refill, repair, remanufacturing, recycling).
- Help students connect examples to different stakeholders (shops, delivery companies, customers, waste management).

Student Action:

- List examples of packaging they encounter daily (school, shopping, deliveries).
- Identify what typically happens to this packaging after use, and what is missing to make it more circular.

Why:

- Establishes a common baseline of understanding and engages students with the topic before they start research.

Short Presentation on Circular Packaging & E-commerce

Teacher Action:

- Show the video explaining the Circular Economy “butterfly diagram”:
[youtube.com/watch?v=Lc-FQvPO89Y](https://www.youtube.com/watch?v=Lc-FQvPO89Y)
- Ask comprehension questions.
- Highlight challenges like single-use plastic, fragile-goods shipping, and refill-station logistics.
- Guide students towards examples of circular innovations, e.g. reusable packaging schemes, deposit-return systems, refill stations.

Student Action:

- Observe and take notes.
- Relate video examples to their own city context.

Why:

- Provides factual background to frame the problem and introduces possible types of solutions.

Introduce the Learning Situation & Driving Question

Teacher Action:

- Present the driving question: “How can a plastic-free company safely deliver fragile glass products and manage high-volume refills without compromising its environmental values?”
- Present the task: explain to students that they will prepare a proposal responding to the company's “Design for Circularity” challenge.
- Emphasise that their work must follow an enquiry-based approach: Explore → Research → Analyse → Ideate → Present → Reflect.

Student Action:

- Read the relevant Knowledge Pill(s) on the Circular Economy and packaging.

Why:

- Frames the challenge and ensures students have the basic knowledge needed and understand the task before starting research.

LESSONS 2 - 6: Research, Analyse, and Ideate

Objective: In smaller groups (3-4 persons), students gather evidence, analyse it, and develop potential solutions based strictly on research and analysis.

Nb: Remind students that effective project management, including careful planning, clear role allocation, and setting realistic deadlines, is essential for completing their work efficiently.

Step 1: Research & Evidence Collection (Lesson 2 - 3)

Teacher Action:

- Guide the students to identify what type of evidence is needed to design an informed proposal for circular packaging.
- Explain the types of evidence needed:
 - First-hand evidence: surveys, interviews, or focus groups with local shop owners, delivery workers, or customers.
 - Second-hand evidence: Knowledge Pills, reliable reports, case studies of circular packaging companies, academic studies, newspaper articles, or statistics.
- Emphasise that no solution ideation should begin before evidence is collected and analysed.
- Point students to the Oway case study within the Urban Circular Economy Knowledge Pill as a strong starting reference - a real local company facing a very similar plastic-free packaging challenge.

Student Action:

- Determine what evidence is needed for the task.
- Collect first-hand evidence: stakeholder input, surveys, interviews (e.g. with a local business, delivery service, or classmates' shopping habits).
- Collect second-hand evidence: YSC Knowledge Pills (including the Oway case study), research studies, government or NGO reports, news articles, case studies of existing circular packaging schemes.

Why:

- Gathering reliable evidence ensures that proposed solutions are grounded in facts and local context rather than assumptions.

Step 2: Analyse Evidence (Lesson 4 - 5)

Teacher Action:

- Guide students to make sense of collected data: identify patterns, needs, constraints, and priorities.
- Help students summarise findings in a clear format (charts, tables, diagrams).

Student Action:

- Analyse collected data to identify key insights about:
 - Where: packaging waste is generated, and where circular solutions already exist.

- Who: the needs and perspectives of consumers, businesses, delivery companies, waste management services.
- Why: the current system creates environmental challenges (single-use packaging, inefficient logistics, lack of alternatives).
- How: feasible solutions such as reusable packaging, refill logistics, deposit-return schemes, or digital tracking systems.

Why:

- Critical analysis ensures that solutions are based on verified needs and context-specific evidence.

Step 3: Ideate Evidence-Based Solutions (Lesson 6)

Teacher Action:

- Encourage students to propose solutions based on empirical evidence and analysis.
- Ensure solutions address feasibility, sustainability, and community/environmental benefits.

Student Action:

- Describe the chosen packaging challenge, product category or circular system, and the current state of the problem.
- Identify the motivation for change and the vision for a more circular solution.
- Present a clear design proposal (e.g. reusable protective packaging, refill logistics redesign, deposit-return scheme, biodegradable filler material) justified by evidence.
- Identify stakeholders' priorities and outline the impact of the proposed change.
- Propose an implementation and maintenance plan, identifying how the solution would work in practice (refer to logistics, incentive schemes, or smart tracking tools where relevant).

Why:

- Guarantees that design proposals are grounded in evidence, are practical, and socially and environmentally responsible.

LESSONS 7 - 8: Present, Feedback, Reflect

Objective: Students present proposals, receive feedback, and refine final solutions.

Presentation & Feedback (Lesson 7)

Teacher Action:

- Explain that peer and expert review are important when preparing a proposal; they help improve the overall quality of the end product.
- Facilitate presentations to class or panel.
- Encourage external feedback from the local business, community members, parents, experts or other students.

Student Action:

- Present proposals using visuals and clear explanations.
- Reflect on feedback and make adjustments where needed.

Reflection Prompts:

- What have we learned?
- What does it mean for the future generation?
- What did peers/stakeholders like/dislike? Why? Can these be accommodated?
- Did everyone succeed in delivering their assignments?
- What can be improved next time?

Why:

- Reflection and feedback improve solution quality and develop metacognitive and collaboration skills.

Final Submission & Voting (Lesson 8)

Teacher Action:

- Collect refined proposals and facilitate voting.

Student Action:

- Submit final proposal.
- Vote for the strongest solution based on evidence, feasibility, and stakeholder impact.
- Submit proposals to the local company/stakeholder behind the “Design for Circularity” challenge.

Optional Extensions

- Field Trip: Visit a local shop, refill station, or delivery/logistics hub to observe packaging in practice.
- Guest Speaker: A packaging designer, circular economy expert, or the owner of a local sustainable business to discuss real-world constraints.