

Learning Situation

Circular Packaging – The Plastic-Free Delivery Dilemma

Cities generate enormous amounts of waste every day — and much of it comes from packaging. Products are manufactured, transported, sold, used and discarded, often using containers designed for a single purpose. Although recycling has become common in many places, valuable materials are still lost after only one life cycle, while the production of new packaging continues to consume energy, raw materials and resources.

The principles of the **Circular Economy** offer a different approach. Instead of designing products that quickly become waste, circular systems aim to keep materials in use for as long as possible — through reuse, refill, repair, remanufacturing and intelligent product design. Cities around the world are adopting circular solutions not only to reduce waste, but also to lower carbon emissions and build more resilient local economies.

This Learning Situation invites students to investigate a real packaging dilemma faced by a local business and explore how everyday products — and the systems that deliver them — could become part of a more circular urban economy.

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.

The first concerns **e-commerce deliveries**. Glass bottles are fragile and require protective packaging during transport. At present, the company relies on large quantities of cardboard and paper-based fillers. These materials are bulky, expensive to ship and often fail to prevent breakage, leading to wasted products, unhappy customers and a high carbon footprint from returns.

The second challenge concerns the company's **refill system**. Customers are encouraged to top up their glass bottles at in-store refill stations rather than buying new ones. However, the large quantities of soap delivered to these stations are transported in industrial plastic containers of 20 to 50 litres. The refill system itself therefore still depends on plastic — directly contradicting the company's sustainability goals.

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. Their work should present innovative yet feasible ideas that combine environmental responsibility, practical implementation and the principles of the Circular Economy.

This activity implies a holistic approach.

Students explore the Driving Question by considering several interconnected aspects of designing a viable circular solution — such as analysing the life cycle of products and packaging, identifying environmental impacts, understanding the needs of different stakeholders, evaluating technological opportunities, and assessing the feasibility of alternative materials, logistics or reuse systems.

This Learning Situation is intentionally broad and flexible, allowing each group of students to choose the challenge they consider most relevant within their own community. Some groups may focus on product design, others on logistics, refill systems, reusable packaging, consumer behaviour or digital solutions that support circular resource management. This encourages students to take ownership of their inquiry, collaborate effectively, and develop creative solutions that reflect local opportunities and constraints.

To support this process, teachers may use the **Lesson Plan** developed for this topic, which guides the activity step by step and structures this holistic exploration.

(Insert link to Lesson Plan)

Alternative Approaches

In addition to the approach described in the Task above, we also propose alternative ways of implementing the Learning Situation. When choosing one of these alternative options, the Lesson Plan developed for the main Driving Question can still serve as a reference, but it should be adapted to match the different structure and focus of the chosen approach.

1. Single-Challenge Approach

Teachers may choose to focus the activity on **one specific circular economy challenge** that is particularly relevant to the local context.

This option is often easier to manage because:

- it may require less time, since the class concentrates on a single well-defined challenge;
- it simplifies planning, as all students work within the same theme;
- it increases local relevance, allowing teachers to select a challenge that is meaningful and visible in the school's immediate surroundings.

In the single-challenge approach, all student groups will work on the same overarching circular economy challenge. To provide focus and structure, each group can be assigned one of four perspectives to guide their investigation:

- **Where:** Investigating where packaging waste is generated, where circular solutions already exist, and where the greatest opportunities for improvement are.
- **Who:** Exploring the needs and perspectives of consumers, local businesses, retailers, delivery companies, waste management services and municipalities.
- **Why:** Examining why the current system creates environmental challenges — excessive single-use packaging, inefficient logistics, lack of alternatives or economic barriers.

- **How:** Identifying feasible solutions such as reusable packaging, refill stations, deposit-return schemes, biodegradable materials, digital platforms or smart tracking systems.

This structure allows students to specialise in one dimension of the challenge while maintaining a shared focus. At the end of the research phase, the groups will come together to combine their findings, creating a comprehensive understanding of the issue and collaboratively proposing informed, well-rounded solutions.

Suggested Local Challenges (What can be done...?)

Reducing packaging waste in local shops

Students investigate how shops, supermarkets or local businesses currently package and distribute their products.

What can be done to reduce unnecessary packaging and encourage reusable or refillable alternatives?

Improving refill systems

Students analyse existing refill stations for products such as detergents, cosmetics or food and examine the challenges involved in transporting and storing products without relying on disposable plastic containers.

What can be done to make refill systems truly circular throughout the entire supply chain?

Making e-commerce more sustainable

Students investigate how products ordered online are packaged and delivered, paying particular attention to fragile products that require protective packaging.

What can be done to make online deliveries safer while reducing packaging waste and environmental impacts?

Creating circular solutions in schools

Students examine how packaging is used in their own school — for lunches, drinks, learning materials or school events — and identify opportunities for reducing waste.

What can be done to introduce reusable, refillable or returnable packaging systems within the school community?

Encouraging deposit-return and reuse systems

Students investigate existing systems for returning bottles, containers or packaging and compare them with examples from other cities or countries.

What can be done to encourage citizens to reuse packaging instead of throwing it away after a single use?

2. Developing Your Own Learning Situation

Teachers may design their own Learning Situation within the broader topic of Urban Circular Economy. The examples presented above are intended as suggestions and can be adapted, combined or replaced with other local challenges that better reflect students' environment, community needs and available opportunities. Teachers are also encouraged to consult local businesses, municipalities, environmental organisations or other stakeholders to identify authentic and meaningful sustainability challenges.

A good Driving Question should:

- be relevant and motivating for students;
- focus on a real challenge that students can observe and investigate in their own community;
- be feasible within the available time and resources;
- encourage structured group work and enquiry-based learning;
- involve accessible stakeholders (businesses, schools, municipalities, environmental organisations, citizens or local entrepreneurs);
- be linked to at least one of the five project competences.

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