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GREEN LOOP

TEACHER TRAINING MODULES

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Green Loop Teacher Training Modules

Module 1

UNDERSTANDING THE CIRCULAR ECONOMY

About the Modules

This five-part module series is designed to empower teachers with the knowledge, tools, and confidence to integrate circular economy principles into their teaching practice. Each module builds on the previous one, guiding educators from foundational understanding to the real-world application of circular solutions in school settings.

These learning modules have been developed as part of the Erasmus+ project “Green Loop” (Agreement No: 2024-2-SK01-KA210-SCH-000278989) under the **Key Action 2: Small-scale partnerships in school education (KA210-SCH)**.

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**The views expressed in this publication are those of the authors and project team, and the European Commission cannot be held responsible for any use which may be made of the information contained therein.*

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MODULE1

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INTRODUCTION

Circular economy is not only a global sustainability concept, but also a practical approach that can transform everyday school life. Teachers deal daily with issues such as paper copies, classroom waste, and broken materials. They also encounter broader challenges like canteen packaging and unused supplies.

By connecting circular thinking to these familiar contexts, educators can both reduce waste in their own practice and empower students to become sustainability role models. Each module therefore provides examples and activities that can be directly adapted to lessons, school routines, and student projects.

In this way, the *Green Loop* modules invite teachers to turn everyday teaching moments into opportunities for circular change.

This module aligns with UNESCO's Education for Sustainable Development Roadmap (2020) and the European Commission's Circular Economy Action Plan (2020), ensuring that classroom practice is connected to wider policy priorities.

Module 1 – Understanding the Circular Economy

Aim

This module introduces the core principles of the circular economy and links them to everyday school practice (e.g., classroom waste, photocopying, canteen packaging). By the end of the module, teachers will have practical tools to review their own habits and to design ready-to-use activities within their teaching practice (see Ellen MacArthur Foundation, 2019).

Learning Objectives

By the end of this module, teachers will be able to:

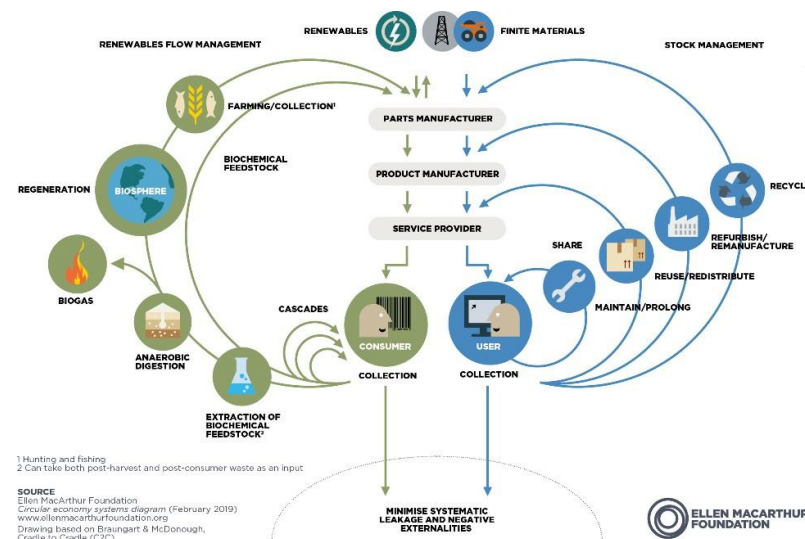
- Define the 5Rs (Refuse, Reduce, Reuse, Repair, Recycle) and explain their relevance in schools.
- Differentiate between linear and circular economies using real school-based examples.
- Identify key environmental problems linked to waste and overconsumption.
- Reflect on how their own teaching habits create waste or support sustainability.
- Plan and deliver a simple classroom activity or mini-project that applies one or more of the 5Rs in a school context.

Core Content

Core topics you will explore in this module:

- The 5Rs of waste: what they mean and how to integrate them into teaching and school routines.
- Linear vs Circular economies: simple diagrams and practical examples.
- Where waste goes: from landfill to oceans to electronic waste (e-waste) streams.

Everyday choices that matter: how food, packaging and travel habits affect sustainability—and how teachers can link these directly to student learning.



1.1. Linear Economy

A linear economy is a traditional way of producing and using goods. In this system, resources are taken from nature, turned into products, used, and then discarded—often called a “one-way” or “take–make–use–dispose” model (Geissdoerfer et al., 2017).

This process typically follows four stages:

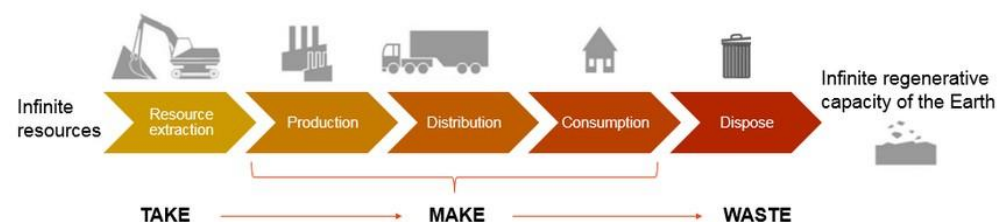
1. **Take** – Extracting natural materials from the environment (e.g., oil, trees, minerals).
2. **Make** – Transforming these materials into products, using energy and machinery.
3. **Use** – Consuming the products, often only once or for a short time.
4. **Dispose** – Discarding the products, which often end up in landfill or are incinerated.

In schools, this appears as single-use plastic cups in the canteen, worksheets discarded after one lesson, or broken pens thrown away rather than repaired.

Key Problems of the Linear Economy

- It assumes natural resources are infinite.
- It generates excessive waste and pollution.
- It contributes to climate change and harms ecosystems.
- It favours cheap, short-life goods over durable and repairable alternatives.

This “take–make–dispose” pattern is visible in everyday teaching practices, where single-use and short-life materials quickly accumulate waste in schools.



Hartmann, C. G. (2018). *Exploring the role of independent retailers in the circular economy: A case study approach* (Master's thesis). Adapted for educational use.

1.2. Circular Economy

A circular economy is a regenerative, resource-efficient model. Instead of creating waste, it keeps products and materials in circulation **at their highest value** for as long as possible, while protecting and restoring nature (Ellen MacArthur Foundation, 2019).

Unlike the traditional “take–make–use–dispose” pattern of the linear economy, the circular economy follows a **closed-loop** approach:

Make → Use → Reuse/Repair/Refurbish → Recycle/Remanufacture → Make again

Core Principles of the Circular Economy

1. Design out waste and pollution

Products and systems are created to prevent waste before it happens.

Examples (school): using fewer materials in classroom resources, designing items that are easy to repair, replacing single-use worksheets with digital or reusable alternatives.

2. Keep products and materials in use

Items are used repeatedly—through reuse, sharing, repair, refurbishment, or recycling— so their value is retained.

Examples (school): repairing a broken chair rather than discarding it; reusing binders and folders across years; setting up a “reuse station” for school supplies.

3. Regenerate natural systems

Nature is part of the cycle; activities should restore ecosystems and return nutrients to the soil.

Examples (school): composting food waste from the canteen; planting and caring for trees in the school garden; exploring renewable energy options such as solar.

Note: The **5Rs (Refuse, Reduce, Reuse, Repair, Recycle)** support these principles—especially by preventing low-value, single-use flows in the first place.

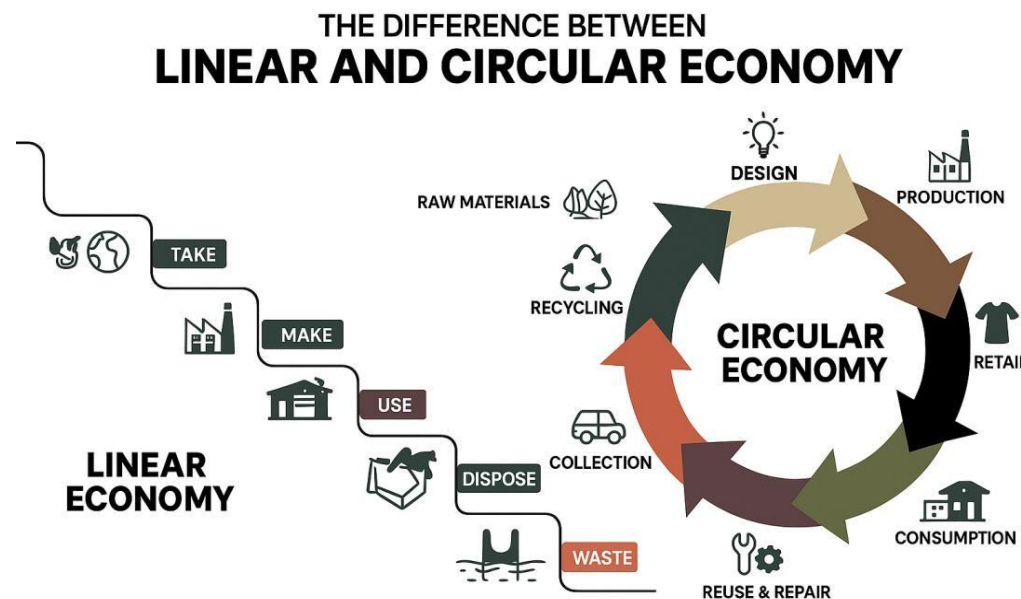
The circular economy model:
less raw material, less waste, fewer emissions



Source: European Parliament Research Service



1.3. Linear Economy vs Circular Economy



Source: Behún & Behúnová (2023), Advanced Innovation Technology of BIM in a Circular Economy, Appl. Sci., 13(13), 7989. Licensed under CC BY 4.0.

This principle is not only theoretical but can be observed in daily school life. To make the idea more concrete, try the following activity:

Think-Pair-Share:

Look around your school or home:

- Which products clearly follow a “take–make–dispose” (linear) model?
- How might these products be redesigned or used differently to become more circular?

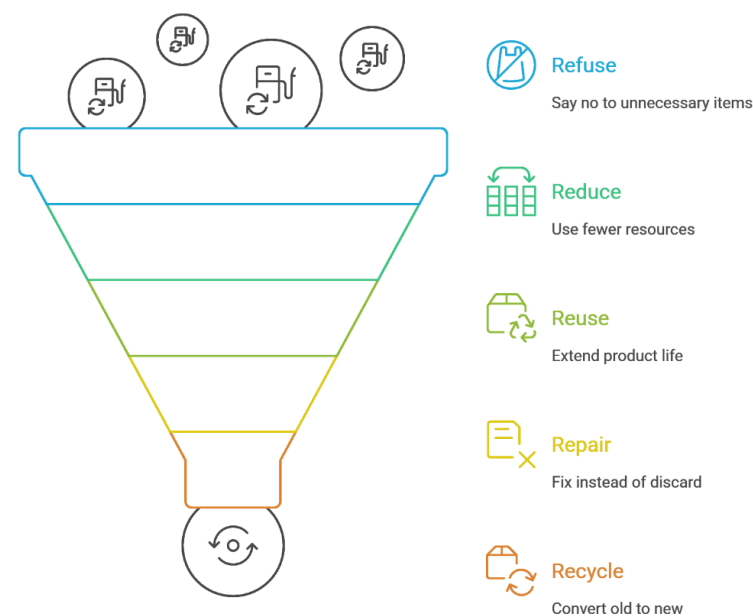
1.4. Understanding the 5Rs: A Simple Tool to Reduce Waste

The 5Rs are a key idea in the circular economy. They provide a clear, simple framework to reduce waste and keep products in use for longer (Stahel, 2016).

1. **Refuse** – Say no to things we do not need (e.g., unnecessary packaging, single-use plastics, or products designed for obsolescence). *Example:* Refusing plastic cutlery in the school canteen.
2. **Reduce** – Use fewer resources and choose products that last longer. *Example:* Printing worksheets on both sides or reducing unnecessary photocopies.
3. **Reuse** – Extend the life of products by sharing, borrowing or repurposing. *Example:* Reusing folders, binders or boxes each school year instead of buying new ones.
4. **Repair** – Fix items instead of discarding them, saving materials and money. *Example:* Repairing a broken classroom chair instead of replacing it.
5. **Recycle** – Convert old materials into new products; this comes **after** refusing, reducing, reusing and repairing. *Example:* Separating paper, plastic and metal in classroom recycling bins.

Teachers can integrate the 5Rs into classroom routines and wider school practices to model sustainable **behaviour** for students.

Sustainable Resource Management Funnel



Made with  Napkin

1.5. ACTIVITY 1.1: Waste in My Day: Discovering the 5Rs

Purpose of this Activity

This activity helps teachers connect circular-economy ideas to daily routines. By observing the waste, they produce over a normal day (or one school day), they begin to reflect on personal habits and link them to the 5Rs—before redesigning anything.

Materials Needed

- Pen and paper, or a digital **note-taking** tool
- 24-hour reflection sheet (template provided / Annex)
- Optional: Miro, Padlet, Flip, Google Forms (or FigJam) for sharing reflections

Step 1 – Observe Your Own Waste (approx. 10 mins to log; run over one day)

Keep a simple record of **3–5** items you threw away or used only once. *Examples:* photocopy sheets, snack wrappers, plastic cutlery, broken pens, single-use cups.

Optional columns:

- What was the item?
- When and where did you use it?
- How long did you use it before throwing it away?

Step 2 – Reflect Using the 5Rs (approx. 10 mins)

Choose two or three items and ask:

- **Refuse:** Could I have refused this item?
- **Reduce:** Could I have reduced its use?
- **Reuse:** Could I have reused it instead of using it once?
- **Repair:** Could I have repaired it (if broken)?
- **Recycle:** Could I have recycled it properly?

Write short notes: what you did, and what you could have done differently.

Step 3 – Identify Your Habits (approx. 10 mins)

- Which of the 5Rs do you already practise most?
- Which do you rarely apply?
- What small action could you try next week to improve?

Step 4 – Connect It to the Classroom (approx. 10 mins)

After completing the activity personally, reflect on how you could adapt it for your students:

- How would you adapt it? (shorter version, canteen-only focus, drawing task)
- Which age group would it suit best?
- What kind of discussion or follow-up would you plan?

Example adaptations:

- **Younger students:** Draw one thing they threw away today and choose which “R” could apply.
- **Older students:** Track canteen waste during one lunch break and brainstorm improvements.

1.6. ACTIVITY 1.2: From Bin to Blueprint: Rethinking Everyday Products

Purpose of this Activity In this activity, teachers explore the full life cycle of a familiar school object— from resource extraction to disposal. By analysing its journey, they uncover where and why waste occurs and then reimagine the object using circular economy principles. This helps move from awareness to action and prepares teachers to guide students through design thinking-driven redesign tasks (Guinée, 2002). Materials Needed • One common school object per group (e.g., photocopy sheet, broken marker, snack wrapper, disposable cup, plastic folder) • A3 paper or Redesign Canvas template (Annex) • Sticky notes, markers, scissors (optional) • Optional: Miro, FigJam, Canva or Flip for digital presentation	Step 1 – Trace the Journey (<i>approx. 10 mins</i>) Map the current life cycle of the object: Where does it begin? How is it used? Where does it end up? Use the typical linear model: Take → Make → Use → Dispose.	Step 2 – Identify Waste Points (<i>approx. 10 mins</i>) Analyse why this object becomes waste: • Is it designed for single use? • Is it made of hard-to-recycle materials? • Is it difficult to repair or refill? Note 2–3 key issues.
Step 3 – Rethink and Redesign (<i>approx. 15 mins</i>) Redesign the product using circular principles: Make → Use → Reuse/Repair → Recycle → Make again. Sketch a redesign that: • uses fewer or renewable materials; • is easier to reuse, refill or repair; • has a longer lifespan; • avoids becoming waste. Present it as a drawing, product concept or simple mock-up.	Step 4 – Share Our Designs (<i>approx. 10 mins</i>) Groups share their designs and give feedback: • 1 thing you liked most; • 1 idea to improve; • 1 possible use in a school context.	Step 5 – Reflection & Evidence (<i>approx. 5 mins</i>) • What part of this redesign was most surprising? • One change we could realistically implement in our school within the next month is... • How could this activity be adapted for different age levels? • Evidence (optional): photo of the life-cycle map and redesign sketch; 1-sentence rationale. <i>Inclusion tip (optional):</i> Provide a pictorial canvas for early readers; allow audio notes/submissions for ELL/SEN.

1.7. Worksheets for 'From Bin to Blueprint'

LIFE CYCLE MAPPING: THE JOURNEY OF A PRODUCT

Product name: What materials is it made from? (e.g., plastic, paper, metal, bio-based, mixed) Where is it manufactured? (e.g., local/regional supplier, imported, factory)	How is it transported and used? (e.g., delivery truck/van, used daily in class) What happens after it's thrown away? (e.g., bin → landfill, recycling centre, reuse) What part of the design causes the most waste? (e.g., single-use packaging, hard-to-recycle material, non-replaceable parts)
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CIRCULAR REDESIGN CANVAS

Problems with the current design (2–3 points): Sketch your redesigned product (<i>draw or describe below</i>) [Space for drawing / notes] How does your new design avoid waste / keep value in the loop?	Which 5Rs are reflected in your design? (<i>tick all that apply</i>) ☐ Refuse ☐ Reduce ☐ Reuse ☐ Repair ☐ Recycle Could this design be used in a school context? How?
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Suggested Use of Digital Tools

Tool	Use in this activity
Miro	Collaborative brainstorming and life-cycle mapping
Google Forms	Track and record daily waste reflections
Canva / Google Sheets	Create infographics, charts, or redesign posters
Padlet	Share redesign ideas and reflection posts
Flip / Loom	Create short video explanations of redesigned products

1.8. ACTIVITY 1.3: Map Your School: Understanding Material Flows and Circular Opportunities

Purpose of this Activity

This activity invites teachers to step into the role of a **systems thinker**. By tracing how materials (e.g., paper, plastic, food waste) move through their school, teachers gain a clearer view of resource use and waste. This hands-on mapping reveals the hidden systems behind everyday items and opens the door to small, achievable circular changes (Meadows, 2008).

Materials Needed

- Pen and A3 paper, or a large notebook
- Optional: Miro, FigJam, Coggle, or Canva (for digital mapping)
- Optional: access to the staffroom, storage area, or the caretaker/janitor for real-world input

Step 2 – Investigate Their Journey (run-time flexible)

For each item, ask and note:

Item	Where does it come from?	Who uses it?	How is it disposed of?	Could it be reused/recycled?
.....	supplier/local/imported	students/teachers/staff	bin → landfill / recycling centre / reuse	yes/no – how?

Tip: Ask your school's cleaner/caretaker how materials are bought, used and discarded.

Step 4 – Reflect Using Systems Thinking (approx. 5–10 mins)

Look at your map and ask:

Where is most waste created?

- Is there a point where reuse or recycling could happen but does not?
- Circle one **leak** on your map: how could it be **closed**?

Step 5 – Imagine a Small Intervention (approx. 5 mins)

Identify one small circular idea you could propose or try in your school.

Examples:

- Replace plastic cups with reusable ones in the staffroom.
- Create a paper-scrap reuse box in the photocopy area.
- Introduce a **pen-refill** station instead of buying new pens.

Write your idea using this sentence starter:

"One small change I could make in my school this month is _____, because _____."

Step 1 – Choose 2–3 Items from Your School (approx. 5 mins)

Pick items that are regularly used and often discarded.

Examples: paper towels, plastic bottles, food containers, disposable pens, photocopy paper, snack wrappers, glue sticks.

Step 3 – Create a Simple System Map (approx. 10–15 mins) Turn your notes into a **visual map**. Use arrows, icons or sketches to show how each item flows through your school.

Example flows:

- **Photocopy paper:** supplier → teacher → classroom → bin → landfill
- **Snack wrapper:** supplier → canteen → student → bin → landfill (*no recycling*)

Try to show:

- where the item starts (supplier/delivery),
- where it goes (classroom, canteen, staffroom),
- where it **ends up** (bin, recycling centre, storage),
- **loops** (reuse/repair paths), **leaks** (one-way, single-use losses) and **loss of value** (down-cycling or disposal).

Reflection & Evidence (approx. 5 mins)

- What surprised me about material flows in my school?
- Which part of the system showed the biggest leak?
- What small intervention could I implement most realistically in my context?
- **Evidence (optional):** photo of the map + one-sentence action commitment.

Inclusion tip (optional): Provide icon stickers or a pictorial key for early readers; allow audio notes/submissions for ELL/SEN.

1.9. RUBRIC – MODULE 1: UNDERSTANDING THE CIRCULAR ECONOMY

Scoring: Each criterion scored 1–4 pts.

Total = $\Sigma(\text{level} \times \text{weight})$. Percentage = $(\text{Total} / 4) \times 100$.

Criterion	Weight	1 – Beginning	2 – Developing	3 – Proficient	4 – Advanced
5Rs Knowledge	20%	Mislabeled or omits Rs; no examples	Defines Rs with weak/partial links	Correctly defines all 5Rs with clear school-based examples	Applies 5Rs creatively across subjects/school routines; prioritises Rs effectively
Life Cycle Awareness (LCA-lite)	20%	Lists stages with major gaps	Stages identified but incomplete description	Full flow mapped with basic leak points	Detailed lifecycle map; identifies leaks/impacts and suggests feasible interventions
Circular Redesign	30%	No or unsuitable idea	Redesign idea but unrealistic	Feasible redesign concept (sketch, prototype, poster)	Redesign shows repairability, modularity, clear reuse/refill potential
Systems Thinking	20%	Sees issues in isolation	Identifies limited actors/flows	Maps key flows and recycling/loop points	Demonstrates feedbacks, stocks/flows, and leverage points
Reflection & Action	10%	No reflection or action	Generic reflection, no concrete step	Reflection with one realistic classroom action	Deep reflection with multiple concrete school-wide actions

* **Acceptable Evidence:** labelled diagram; mini-poster; 150–200-word reflection note; sketch/prototype photo (with consent); action plan.

1.10. REFLECTION

1. Insights & Challenges

- What surprised you most when tracing products or mapping material flows?
- What was the most challenging part of redesigning or mapping?

2. Sources of Waste

- What are the biggest sources of waste in your school or classroom?
- Are they obvious (e.g., bins) or hidden (e.g., printing habits, packaging, digital workflows)?

3. Systems Thinking & the 5Rs

- How did systems thinking help you see waste in a new way?
- Which of the 5Rs are easiest for you to apply, and which are hardest? Why?

4. Action

- What is one concrete action you will take—either individually or in your school—to reduce waste or support circular practices in the next month?

Optional – Adapting for Students

- How could you adapt one of these activities for your students?
- Would you change the tools, time or focus area to suit their level?

Optional – Evidence / Exit Ticket (1 min)

- One change I will make this week is _____, because _____.
- (Optional) Upload a photo of your map or redesign sketch.

1.11. QUIZ

1. **Which of the following best describes a linear economy?**
- A. A system where resources circulate continuously without producing waste
 - B. A system where products are repaired, reused, and recycled before disposal
 - C. A system where resources are extracted, products are made, used briefly, and then discarded
 - D. A system that regenerates natural systems and keeps materials in use

Correct: C

2. **The 'Refuse' step in the 5Rs is best explained as:**
- A. Avoiding the use of single-use or unnecessary items, even if they are recyclable
 - B. Using fewer resources and choosing longer-lasting products
 - C. Saying no only to items that are non-recyclable
 - D. Returning materials to the system through composting or recycling

Correct: A

3. **Which is the strongest example of 'Reduce' in a school context?**
- A. Printing 100 single-sided worksheets for a lesson
 - B. Using a refillable whiteboard marker instead of disposable ones
 - C. Encouraging students to bring reusable bottles
 - D. Sorting waste into recycling bins at the end of the day

Correct: B

4. In a circular economy, the correct flow is:

- A. Take → Make → Use → Dispose
- B. Collect → Produce → Replace → Burn
- C. Make → Use → Reuse/Repair → Recycle → Make Again
- D. Extract → Manufacture → Consume → Export

Correct: C

5. Which of the following is NOT part of the 5Rs?

- A. Refuse
- B. Reduce
- C. Reinvent
- D. Repair

Correct: C

6. What is the biggest limitation of recycling compared to the other Rs?

- A. Recycling eliminates all forms of waste completely
- B. Recycling should be the first step in sustainable consumption
- C. Recycling often requires extra energy and resources, and should come after refusing, reducing, and reusing
- D. Recycling is unnecessary if products are reused

Correct: C

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Green Loop Teacher Training Modules

Module 2

SYSTEMS THINKING AND DESIGN FOR SUSTAINABILITY

About the Modules

This five-part module series is designed to empower teachers with the knowledge, tools, and confidence to integrate circular economy principles into their teaching practice. Each module builds on the previous one, guiding educators from foundational understanding to the real-world application of circular solutions in school settings.

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INTRODUCTION

Module 2 introduces systems thinking as a foundation for sustainability education. Teachers explore how environmental, social, and economic systems are interconnected, and how the circular economy provides a holistic framework for addressing these challenges. The module also presents design-oriented approaches such as Design Thinking (DT) and Design-Based Learning (DBL), giving teachers practical methods to guide students from awareness to action.

Through readings, classroom-ready activities, and digital tools, teachers learn to help students move beyond surface-level observations of waste and towards identifying root causes, systemic connections, and innovative solutions. By the end of the module, educators will be equipped to design lessons that are interdisciplinary, problem-based, and aligned with the Sustainable Development Goals (SDGs).

MODULE 2. Systems Thinking, Sustainability, Design Thinking & Design-Based Learning

Aim

This module introduces systems thinking as a key tool in sustainability education. Teachers will learn how environmental, social, and economic systems are connected, and how the circular economy provides a holistic framework for long-term solutions. Building on Module 1's introduction of the 5Rs (Refuse, Reduce, Reuse, Repair, Recycle), this module expands the perspective from everyday actions to systemic approaches.

Through interactive activities, design-based simulations, and reflection tasks, teachers will practise skills that help students move from surface-level awareness of waste to deeper systems-level understanding and innovative problem-solving. This module aligns with UNESCO's *Education for Sustainable Development Roadmap (2020)* and the European Commission's *Circular Economy Action Plan (2020)*, ensuring a policy-relevant foundation.

Learning Objectives

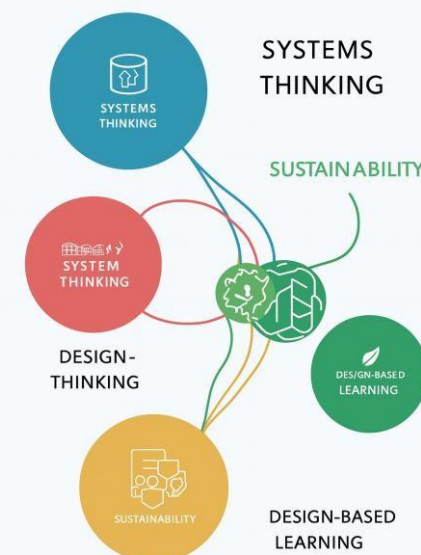
By the end of this module, teachers will be able to:

- Define systems thinking and explain why it matters in sustainability education.
- Analyse a familiar classroom or school issue using a systems lens.
- Connect circular economy strategies to relevant Sustainable Development Goals (SDGs).
- Facilitate digital and design-based activities that promote systems thinking.
- Apply inclusive strategies (e.g., Universal Design for Learning principles) to ensure diverse learners can engage in systems and design activities.
- Plan lessons that integrate interdisciplinary, problem-based learning approaches.

Core Content

Core topics explored in this module include:

- **What is systems thinking?** Elements, connections, feedback loops, and how they apply in schools.
- **Why it matters for teaching and learning:** moving from single issues to interconnected challenges.
- **Circular economy as a systems approach:** linking classroom practice to multiple SDGs.
- **Design Thinking (DT):** a step-by-step method for moving from insights to solutions.
- **Design-Based Learning (DBL):** how students learn by designing, making, testing, and reflecting.
- **Digital tools for mapping and collaboration:** Miro-Canva-Padlet-Mentimeter



2.1. What is Systems Thinking?

Systems thinking is a way of seeing the world as a web of relationships rather than isolated parts. Environmental problems rarely have a single cause; they emerge from many interconnected factors. Meadows (2008) describes systems as having elements, interconnections, and purposes—and invites us to look for feedback loops and delays as we analyse them.

Example – a plastic bottle

A plastic bottle is not just “waste”; it connects to many systems, including:

- oil extraction; manufacturing processes; transport emissions; recycling infrastructure; consumer habits; marine ecosystems; climate impacts

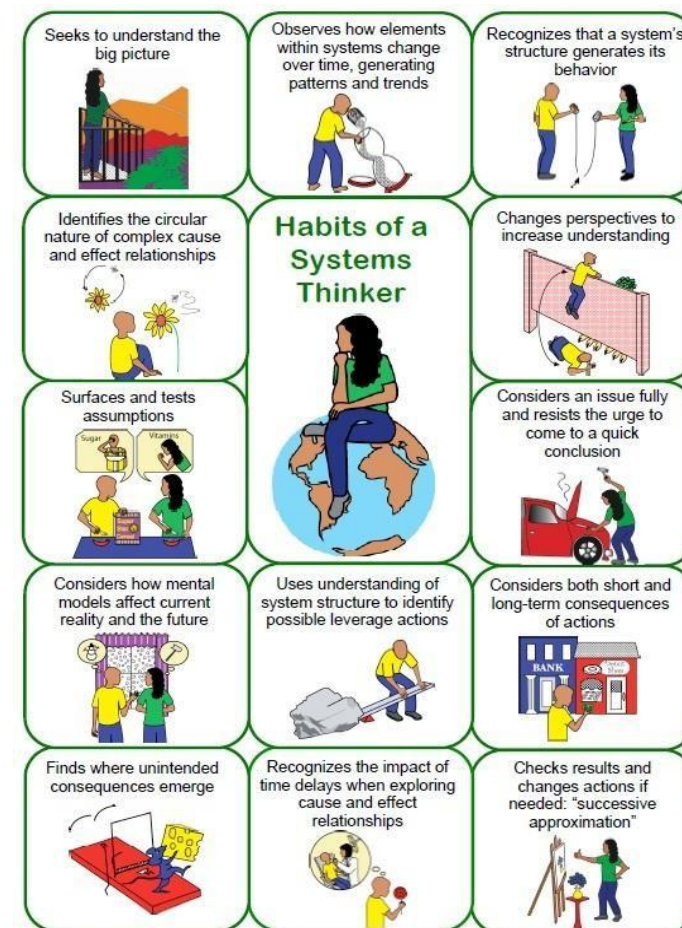
Key questions in systems thinking

- What affects what?
- If this changes, what else is affected?
- Where could we intervene for the biggest effect?

Why it matters in schools

As sustainability educators, systems thinking helps students move beyond surface-level symptoms (e.g., plastic waste in the canteen, heavy photocopying) to explore root causes (e.g., over-packaging, limited collection/sorting infrastructure, consumption habits). It also strengthens critical thinking and holistic problemsolving.

This builds directly on Module 1’s focus on the 5Rs: while those strategies provide simple entry points for waste reduction, systems thinking helps teachers and students see how the 5Rs are embedded in broader social, economic, and ecological systems. Teachers can also use visual tools (icons, system maps, colour codes) to ensure accessibility for diverse learners, following Universal Design for Learning (UDL) principles (CAST, 2024).



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2.2. Circular Economy, SDGs and Systems Thinking

The circular economy is not just about managing waste—it is about rethinking how systems function to create long-term value for people and the planet. From a systems-thinking perspective, circular strategies support many Sustainable Development Goals (SDGs), not only SDG 12 (*Responsible Consumption and Production*). This aligns with UNESCO's *Education for Sustainable Development Roadmap (2020)* and the European Commission's *Circular Economy Action Plan (2020)*, both of which highlight education as a key driver of systemic change.

Examples of connections (with school applications):

- **SDG 12 – Responsible Consumption and Production:** reducing waste and improving resource efficiency (e.g., double-sided printing, school-wide reuse stations).
- **SDG 13 – Climate Action & SDG 7 – Affordable and Clean Energy:** lowering emissions and shifting to renewables (e.g., student-led energy audits of classroom lighting).
- **SDG 6 – Clean Water and Sanitation; SDG 14 – Life Below Water; SDG 15 – Life on Land:** preventing pollution and over-extraction (e.g., monitoring water use in school toilets, avoiding plastic bottles).
- **SDG 8 – Decent Work and Economic Growth:** creating green jobs in repair, refurbishment, and remanufacturing (e.g., inviting local repair café volunteers for workshops).
- **SDG 11 – Sustainable Cities and Communities:** encouraging reuse, shared infrastructure, and low-impact design (e.g., uniform or book exchange programmes).



- **SDG 9 – Industry, Innovation and Infrastructure:** enabling cleaner production and product innovation (e.g., student projects with 3D printing using recycled plastics).

Systems thinking shows that a circular action in one part of a system—**design, production, use or end-of-life**—can ripple across multiple sectors and goals. For teachers, even small classroom activities (e.g., reducing photocopies, reusing materials or redesigning a school routine) can be **explicitly linked to SDGs**, helping students see how local changes contribute to global sustainability.

2.3. ACTIVITY 2.1: Seeing Systems: From Insight to Action

Purpose of this Activity This activity helps teachers identify how everyday materials and routines in schools flow through a system. By mapping these flows, teachers can spot where waste is created (“leaks”) and where reuse or recycling could happen (“loops”). It builds the skill of moving from single issues to system-level understanding and connects back to Module 1’s 5Rs within broader systems. Materials Needed - A3 paper and pens, or a large notebook - Sticky notes or markers (for grouping ideas) - Optional: Miro or Jamboard (for digital mapping)		Suggested Use of Digital Tools Miro / Jamboard: system maps and brainstorming Padlet: collect and compare design ideas Mentimeter: vote on the most promising idea UDL Tip (Multiple Means of Representation): Provide ready-made icon or label sets (e.g., “production,” “transport,” “use,” “bin,” “recycle”) to help students visualise system flows. Use colour coding or pictograms to make connections clearer, especially for ELL (English Language Learners) and SEN (Special Educational Needs) students.
Step 1 – Map the System (10–15 minutes) Choose a product you use regularly (e.g., cotton T-shirt, smartphone, school lunch tray, photocopy paper, snack wrapper). Write or sketch at least five connected systems or actors that influence it. Examples: agriculture, energy, marketing, transport, recycling.	Step 2 – Define the Challenge (5 minutes) Look at your map and ask: - Where is waste or negative impact hidden? - Which part of the system could be redesigned? Write one clear “How might we...?” question. <i>Example: “How might we reduce the waste created by disposable lunch trays in our school?”</i>	Step 3 – Ideate Solutions (10 minutes) Generate as many ideas as possible — no judging yet. Aim for at least 5–7 quick ideas. Encourage wild thinking (“What if...?”) as well as practical suggestions. Extension: Tag each idea with one of the 5Rs (Refuse, Reduce, Reuse, Repair, Recycle) and note any potential SDG connections.
Step 4 – Share and Compare (10 minutes) Post or present your ideas. Use peer feedback: 1 idea you liked most 1 suggestion for improvement 1 way this idea could work in your school context	Reflection (5 minutes) - What affects what in this system? - What would happen if one part of this system changed? - Which design idea feels most realistic for classroom or school adaptation?	

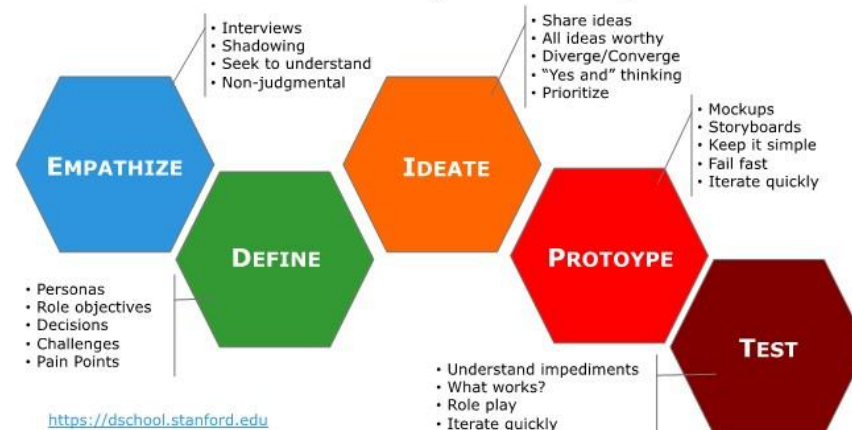
2.4. Design Thinking

Design Thinking is a problem-solving approach that places human needs, creativity, and iterative learning at the centre of innovation. Originally developed in product and service design (Brown, 2009), it is now widely used in education to help students and teachers address complex, real-world problems — including sustainability and the circular economy (Razzouk & Shute, 2012).

The Five Phases of Design Thinking (Hasso Plattner Institute of Design, Stanford, 2010):

1. **Empathise** – Understand the user and their context. In schools, this may mean interviewing students, families, or staff affected by waste or pollution.
UDL tip: Use empathy maps with visuals or icons so all learners can contribute.
2. **Define** – Identify the root problem, not just the symptoms. Instead of “too much plastic,” frame it as: “How might we reduce plastic use in our daily school routines?”
3. **Ideate** – Brainstorm a wide variety of creative solutions. No judging — aim for quantity and imagination.
Classroom example: Post-it brainstorming wall or digital Jamboard.
4. **Prototype** – Turn ideas into small-scale versions: posters, models, flowcharts, mock apps.
Example: A simple Canva poster or cardboard model.
5. **Test & Iterate** – Try it out, collect feedback, and improve.
Encourage students to share their prototypes with peers, collect suggestions, and refine.

Stanford d.school Design Thinking Process



Design Thinking & the Circular Economy

The circular economy is about redesigning systems — and so is design thinking. Both approaches value experimentation, feedback, and solutions that consider the bigger picture (Brown, 2009; Razzouk & Shute, 2012). Building on Module 1’s 5Rs, Design Thinking provides a structured way for teachers and students to **rethink products, behaviours, and school routines** in a circular direction. This approach aligns with UNESCO’s *Education for Sustainable Development Roadmap (2020)* and the European Commission’s *Circular Economy Action Plan (2020)*, ensuring that innovation is both educationally and policy relevant.

2.5. Design-Based Learning (DBL)

Design-Based Learning (DBL) is a student-centred instructional method that engages learners in solving real-world problems through the design process. It combines creativity, research, prototyping, feedback, and revision in a cyclical way that fosters both deep understanding and practical skills (Nelson & Stolterman, 2012).

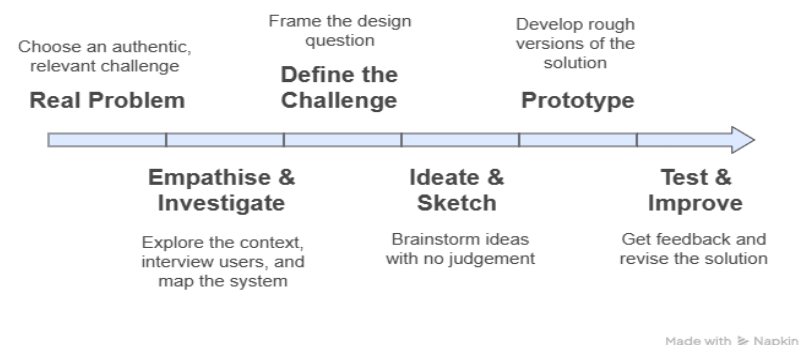
In a DBL classroom, students are not passive receivers of knowledge — they are designers, builders, collaborators, and reflective thinkers (Kolodner et al., 2003).

In a DBL classroom:

- Students learn by doing — actively exploring problems and creating solutions.
- The teacher is a facilitator — guiding inquiry, coaching design steps, and supporting reflection.
- Learning is interdisciplinary — connecting science, technology, art, ethics, communication, and more.
- Success is defined by iteration and impact — not by one “correct” answer. DBL enables students to tackle complex environmental challenges — such as plastic waste, water use, or energy — by designing solutions rather than only identifying problems. This approach aligns closely with systems thinking, the Sustainable Development Goals (SDGs), and the circular economy, as it encourages:
 - Real-world application of concepts.
 - Interdisciplinary and connected learning.
 - Resilience through iteration and improvement.
 - Student ownership, agency, and responsibility for change.

Building on Module 1’s **5Rs framework** and Module 2’s **systems thinking lens**, DBL gives students structured opportunities to redesign products, routines, and school practices in more circular and sustainable ways.

Planning a DBL-Based Sustainability Lesson



Steps to Design a DBL-Based Lesson Plan

1. **Real Problem** — Pick a real challenge in your school/community (e.g., plastics in cafeteria, high paper use, broken equipment).
2. **Empathise & Investigate** — Explore the context, interview users, map the system. *UDL tip:* Use icons/photos for younger or ELL/SEN learners.
3. **Define the Challenge** — Frame a clear “How might we...?” question (e.g., *reduce plastic waste at lunch*).
4. **Ideate & Sketch** — Brainstorm many ideas (sketches, Padlet wall, idea cards).
5. **Prototype** — Create a quick version (poster, model, video, routine).
6. **Test & Improve** — Share with peers/stakeholders; ask “What worked? What to improve?”
7. **Reflect** — Students record what they learned about the problem, process, and teamwork. *UDL tip:* Allow different formats (notes, Flip video, infographic, oral).

2.6. ACTIVITY 2.2: Walk in the Shoes: A Design Thinking Simulation

Purpose of this Activity Teachers experience the full design thinking cycle by role-playing different perspectives in a school waste scenario. The activity develops empathy, creative problem-solving, teamwork, and reflection skills. Materials Needed - Paper, markers, sticky notes - Optional: Canva, Jamboard, Padlet, Flip, Miro, Google Docs	Scenario It is an ordinary school day. By lunchtime, the photocopier has jammed from overuse and a stack of discarded worksheets sits in the recycling bin. In the canteen, students rush through their meals, leaving behind piles of snack wrappers and half-empty plastic bottles. The janitor sighs as he drags another heavy bag of mixed waste to the dumpster. Teachers notice the overflowing bins but feel powerless to change the system — <i>“It’s always been this way.”</i> Parents, meanwhile, are worried about the rising costs of supplies and the unhealthy, wasteful habits their children are picking up. Guiding Question: <i>How might we design a creative and engaging solution that helps our school reduce waste — while making students active partners in building sustainable habits?</i>	
Suggested Use of Digital Tools -Miro / Jamboard: empathy maps and brainstorming -Padlet: collect ideas and share prototypes -Canva / Genially: posters, mock-ups -Flip / Forms: share reflections and feedback digitally	1. Empathise – Understand the Users -Role-play as student, teacher, janitor, or parent. -Use an empathy map (<i>what they say/do, think/feel, see/hear, need/want</i>) to capture experiences and needs.	2. Define – Clarify the Problem Synthesize insights into one clear challenge. Example: “How might we reduce classroom waste while engaging students in the process?”
3. Ideate – Generate Ideas Brainstorm as many ideas as possible (aim for 10+). Then select the top 1–2 ideas to develop further.	4. Prototype – Visualise the Solution Create a quick prototype (poster, toolkit, redesigned object, campaign plan). Use Canva, Jamboard, Flip, or physical materials.	5. Test – Present and Get Feedback Groups present their prototype. Peers give feedback on creativity, feasibility, and impact (using a simple checklist or rubric). Reflection – Look Back - What did you learn from this process? - Which step was most challenging, and why? - How might you adapt this process for your own students?

Empathy Map	Define	Ideation Board
Participants role-play as student, teacher, janitor, or parent. They discuss how each role is affected by the problem and fill in the empathy map: User Role: _____ Says / Does – What does this person say or do? Thinks / Feels – What are their thoughts or feelings? Sees / Hears – What do they observe and hear in daily life? Needs / Wants – What are their real needs or wishes?	Based on empathy findings, frame one clear and focused design challenge. <i>Example:</i> How might we reduce classroom waste while engaging students in the process?	Groups brainstorm as many ideas as possible (aim for 10+). Select the most promising 1–2 ideas using the ideation worksheet. Write ideas here: ----- ----- Top 2 ideas to develop further: ----- -----
Prototype	Test & Reflect – Share and Improve	
Turn the selected idea into a quick prototype: - Poster - Sketch - Digital design - Action plan Tools you may use: Canva, Jamboard, Flip, Genially, or physical materials.	- Each group presents their prototype. - Peers provide structured feedback using the Peer Feedback Form. - Groups revise their design and complete the Reflection Sheet: <i>What worked?</i> <i>What could be improved?</i> <i>How might this idea work in your school?</i>	

2.7. Rubric – Module 2: Systems Thinking & Design for Sustainability

Scoring: Each criterion 1–4 pts. Total = $\Sigma(\text{level} \times \text{weight})$.

Percentage = $(\text{Total} / 4) \times 100$.

Criterion	Weight	1 – Beginning	2 – Developing	3 – Proficient	4 – Advanced
Systems Thinking Use	25%	Lists isolated issues; no systemic links.	Identifies some actors/flows, but limited connections.	Maps multiple actors and flows; identifies basic feedback loops.	Demonstrates a comprehensive map with feedbacks, delays, and leverage points.
Circular Economy & SDG Linkage	20%	No or inaccurate links to CE/SDGs.	Identifies 1–2 SDGs with weak or generic examples.	Correctly links circular strategies to 2–3 SDGs with classroom relevance.	Demonstrates nuanced multi-SDG links; adapts to authentic school practices.
Design Thinking Process	25%	Struggles to follow phases; vague or incomplete outputs.	Completes some phases (Empathise, Define, Ideate), but skips others.	Completes all 5 phases with clear outputs (HMW question, ideas, prototype, feedback).	Applies DT flexibly; integrates user feedback; iterates for improvement.
DBL Integration	20%	Treats DBL as a single activity; little learner engagement.	Uses DBL with limited interdisciplinarity.	Designs DBL tasks that are iterative, student-centred, and cross-disciplinary.	Adapts DBL to authentic challenges; fosters innovation, resilience, and student agency.
Reflection & Action	10%	Minimal reflection; no action step.	Reflection present but weak or generic action.	Critical reflection with at least one realistic classroom action.	Deep reflection with multiple classroom applications; concrete school-wide plan.

**Acceptable Evidence:* Systems maps with identified loops/leaks- SDG linkage notes (written or visual)- Empathy maps, HMW questions, ideation boards, prototypes- DBL mini-lesson design (poster, sketch, or digital)- Reflection sheet or exit ticket with action plan

2.8. REFLECTION

Take a few minutes to reflect on what you learned in this module. You may write individually, discuss in pairs, or share in a group.

Guiding Questions:

1. What new insights did systems thinking give you about school waste or resource use?
2. Which stage of the design thinking or DBL process was most challenging for you, and why?
3. How could you adapt one of the activities from this module for your subject area or age group?
4. What is one small action you could take in your school next month to strengthen a loop or close a leak?

Optional – Student Adaptation

If you were to use these activities with students:

- What would you change (time, tools, or complexity)?
- How would you link the activity to your curriculum goals?

Exit Ticket (1 min):

“One small circular change I will try in my classroom next month is ____ because ____.”

2.9. QUIZ

1. Which of the following best captures the **essence of systems thinking in education**?

- A. Identifying the single most important factor behind environmental problems
- B. Mapping multiple elements and their interconnections within a larger context
- C. Creating linear cause-and-effect chains to simplify complex issues
- D. Focusing only on immediate classroom practices without considering external systems

Correct: B

2. A school decides to ban plastic bottles in the canteen. Which insight from systems thinking explains why this action alone might not reduce overall waste?

- A. The system always adapts to eliminate waste automatically
- B. Actions in one part of a system can create ripple effects in other areas
- C. Waste reduction depends only on changing student behaviour
- D. SDG 12 ensures schools are required to reduce plastic use

Correct: B

3. Which of the following pairs correctly links a circular economy strategy with the Sustainable Development Goals (SDGs)?

- A. Repair and remanufacturing → SDG 8 (Decent Work and Economic Growth)
- B. Energy efficiency → SDG 6 (Clean Water and Sanitation)
- C. Low-impact design → SDG 15 (Life on Land)
- D. Waste segregation → SDG 4 (Quality Education)

Correct: A

4. In the design thinking process, which mistake is most likely if the “Define” stage is weak?

- A. Prototypes will lack creative elements
- B. Ideas will not align with the real user needs
- C. Empathy maps will be incomplete
- D. Feedback will always be negative

Correct: B

5. Which of the following is a distinctive feature of Design-Based Learning (DBL) compared to traditional project work?

- A. DBL emphasises iteration, reflection, and system-level application of solutions
- B. DBL outcomes are judged only on whether the product works in practice
- C. DBL avoids interdisciplinary links in order to focus on one subject deeply
- D. DBL requires digital tools for every stage of the design cycle

Correct: A

6. Which of the following reflections shows the deepest use of systems thinking by a teacher?

- A. “My students enjoyed the activity.”
- B. “The recycling bins filled up faster than expected.”
- C. “When we reduced photocopying, we also lowered paper costs and student awareness of resource use increased.”
- D. “I should spend more time explaining the rules of the activity.”

Correct: C

Scoring Guide:

Each correct answer = 1 point.

- 0–2 → Needs support
- 3–4 → On track
- 5–6 → Strong understanding

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Green Loop Teacher Training Modules

Module 3

DESIGNING CIRCULAR SOLUTIONS

About the Modules

This five-part module series is designed to empower teachers with the knowledge, tools, and confidence to integrate circular economy principles into their teaching practice. Each module builds on the previous one, guiding educators from foundational understanding to the real-world application of circular solutions in school settings.

These learning modules have been developed as part of the Erasmus+ project “Green Loop” (Agreement No: 2024-2-SK01-KA210-SCH-000278989) under the **Key Action 2: Small-scale partnerships in school education (KA210-SCH)**.

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**The views expressed in this publication are those of the authors and project team, and the European Commission cannot be held responsible for any use which may be made of the information contained therein.*

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INTRODUCTION

Module 3 moves from thinking like a designer (Module 2) to **acting like a designer**. It equips teachers to guide students through a complete **Project-Based Learning (PBL)** cycle enriched with **Design-Based Learning (DBL)**—from identifying sustainability problems to **ideating, prototyping, testing, and showcasing** real solutions that link classroom learning to real-world impact.

Using the **circular economy** as a practical framework, teachers support learners to examine everyday materials, map their **life cycles**, and apply **systems thinking** and the **5Rs** to redesign products, routines, or behaviours. Through inquiry, iteration, and creativity, students see how small design changes can close **leaks**, strengthen **loops**, and make a tangible difference in their school and community.

Module 3 provides ready-to-use **tools, activities, and strategies** for facilitating student-led projects, integrating **digital creation tools**, and fostering collaboration and reflection. It builds directly on Modules 1 and 2, ensuring learning is **purposeful, hands-on**, and connected to wider sustainability goals.

This module aligns with UNESCO's *Education for Sustainable Development Roadmap* (2020) and the European Commission's *Circular Economy Action Plan* (2020), ensuring that student-led projects are not only practical but also policy-relevant.

MODULE 3-Designing Circular Solutions

Aim

This module equips teachers to guide students through the full **Project-Based Learning (PBL)** process integrated with **Design-Based Learning (DBL)**. Students identify real-world sustainability issues, devise creative **circular** solutions, and present tangible, impactful outcomes.

Building on the conceptual and design foundations introduced in Modules 1 and 2, this module supports teachers in helping students **act like designers**— planning, prototyping, and showcasing real solutions using **5Rs, systems thinking, and life-cycle awareness**. Through inquiry, iteration, and product creation, students apply circular-economy principles meaningfully within school and community contexts, making learning both purposeful and practical.

Learning Objectives

By the end of this module, teachers will be able to:

- Design and facilitate **student-led projects** grounded in circular-economy challenges.
- Apply **PBL and DBL** methods to support **iterative** solution development.
- Guide students in **creating and refining** digital or physical circular-economy products.
- Use digital tools to support **collaboration, creativity, and communication**.
- **Apply UDL strategies** so diverse learners can access project tasks and express learning.
- **Assess processes and products** using rubrics, peer feedback, and reflective tools aligned with module outcomes.

Core Content

You will explore:

- How **PBL and DBL** complement each other in sustainability education.
- The role of **teachers as facilitators** in student-led projects.
- **Tools and templates** for project planning, prototyping, and assessment (rubrics, checklists, reflection prompts).
- Strategies for connecting classroom projects with **community contexts** and authentic audiences.
- **Digital tools** for creation, collaboration, and reflection (Canva, Flip, Scratch, Tinkercad, Jamboard/**Miro**, Google Forms).

3.1. ACTIVITY 3.1A: Discover & Define: What's the Problem?

Purpose of this Activity This activity helps teachers identify and analyse a real sustainability problem in the school/local context using observation and basic systems thinking. Teachers experience the process now so they can later facilitate it with students. Materials Needed • Pen and notebook or digital device • Miro / Jamboard / Padlet (for collaborative mapping) • Optional: photos or sketches of the chosen area	Step 1 – Choose a Focus Area (approx. 10 min) Think about your school environment. Where might sustainability problems exist? Examples: • School cafeteria (food waste, single-use plastics) • Classrooms (paper use, broken materials) • Playground/garden (litter, resource use) • Energy use (lights, heating, devices left on) Write down one area to explore.	Step 2 – Observe & Take Notes (approx. 15 min) Ask yourself: • What is being wasted? (e.g., plastic wrappers, electricity, paper) • Who uses the space? (e.g., students, teachers, staff) • What behaviours contribute to the issue? • What resources are involved? <i>Tip:</i> Use Miro/Padlet to record keywords, sketches, or photos.
Step 3 – Map the Problem (approx. 15 min) Create a visual Problem Map. In the centre, write the issue (e.g., cafeteria waste). Around it, add: • Causes: Why is it happening? • Impacts: Who/what is affected? • Opportunities: What could be changed? Use arrows or colours to connect causes and consequences.	Step 4 – Ask the Right Questions (approx. 10 min) • What is the root cause of this issue? • What small change could lead to a big difference? • Who would benefit from a solution? • Which part of this system could be redesigned?	Step 5 – Write Your Design Question (approx. 10 min) Formulate a clear “How might we...?” challenge. Examples: • How might we reduce plastic waste in school snacks? • How might we encourage students to use less paper? • How might we make sorting bins easier to use? Share your question with a peer or post it on Padlet
Reflection (approx. 5 min) • What did you notice about waste or resource use that surprised you? • Which part of your Problem Map shows the biggest opportunity for change? • As a teacher, how would you adapt this for your students (time, tools, complexity)?		

3.2. ACTIVITY 3.1B: Mapping the Life of Materials and Rethinking Waste

This activity helps **teachers** practise systems thinking by tracing the full life of a familiar school item and then redesigning it using circular-economy principles such as reuse, repair, or redesign. Teachers experience the process now so they can later guide students in doing the same.

Materials Needed

- A3 paper or large notebook
- Pens, markers, sticky notes
- Optional: Canva, Jamboard, or Miro for digital mapping

Step 3 – Draw Its Lifecycle (approx. 15 min)

On A3 paper or digitally (e.g., Canva, Jamboard, Miro), create a diagram showing the linear lifecycle of the object. Include:

- Arrows to show each stage
- Icons, labels, or short notes (e.g., factory, transport, classroom, bin)

Add colour or sketches if you'd like.

Step 1 – Select a Common Object (approx. 10 min)

Pick one object you or your students use frequently in school.

Examples:

- Disposable pens or glue sticks
- Plastic folders or snack wrappers
- Paper towels or worksheets

Write the object name at the top of your page or on a sticky note.

Step 4 – Rethink the Design (approx. 15 min)

Redesign the product using circular economy principles:

- Could it be refillable, reusable, or compostable?
- Could the material be changed to last longer or be recycled?
- Could the item be shared or replaced with a digital solution?

Draw your redesigned product and show the new circular lifecycle.

Step 2 – Trace Its Journey (approx. 15 min)

Use the prompts below to track the object's journey:

- What is it made from?
- Where was it produced?
- How did it arrive at school?
- Who uses it and how?
- Where does it go after use?

Ask: How long does this object stay useful before it is thrown away?

Step 5 – Share (approx. 10 min)

Share your redesigned product and lifecycle with a colleague or on a Padlet wall.

Reflection (5 min)

- What was the biggest surprise in this activity?
- What would it take to make your redesign real in your school?
- How could students do a similar mapping and redesign task?

3.3. ACTIVITY 3.2: Ideate & Prototype — From Question to Concept

Purpose of this Activity This activity helps teachers brainstorm, select, and prototype a creative circular solution to the problem identified in Activity 3.1, applying 5Rs, systems thinking, and digital tools. Teachers experience the process now to later facilitate it with students. Materials Needed - Large paper, sticky notes, or Jamboard/Padlet - Markers or pens - Optional digital tools: Canva, Genially, Flip, Loom, Tinkercad, Scratch, Google Forms By the end of this activity, teachers will have: - A tested solution idea - A working prototype that represents it - A simple plan to share and gather feedback	Step 1 – Revisit Your Design Question (approx. 5 min) Return to your “How might we...?” from Activity 3.1. Ensure it is: Focused (one clear issue) Actionable (can lead to a solution) Open/Creative (allows multiple directions) <i>Example: “How might we reduce plastic packaging waste in school snacks?”</i>	Step 2 – Brainstorm Ideas (approx. 15 min) Generate as many ideas as possible (quantity first, quality later). As: - What could we create, redesign, or change? - Could it be a tool, poster, routine, campaign, or digital product? - How can we apply the 5Rs (Refuse, Reduce, Reuse, Repair, Recycle)? <i>Examples: reusable snack bags, waste-free snack day, sorting-bin labels, a Scratch game.</i>
Step 3 – Select Your Idea (approx. 10 min) Vote or discuss to choose one strong idea. Use criteria: Practical (feasible in our school) Creative (engaging/novel) Supports circular thinking (5Rs, loops/leaks) <i>Prompt: “If we could only build one thing, what would have the biggest impact?”</i>	Step 4 – Build a Prototype (approx. 20–30 min) Create a first version (focus on clarity, not perfection): Poster/infographic (Canva, Genially) Video/voice pitch (Flip, Loom) 3D model/mock-up (Tinkercad, cardboard, paper) Digital concept (Scratch animation, Padlet/Jamboard board)	Step 5 – Prepare to Test & Gather Feedback (approx. 5 min) Plan how you will share and collect feedback: - Who is the audience (peers, teachers, parents, students)? - What feedback will help improve it (clarity, feasibility, impact)? - Which 2–3 questions will you ask? <i>Optional: Use Google Forms or a one-page feedback sheet.</i>
Reflection (approx. 5 min) - What was most challenging about turning your idea into a prototype? - Which digital tool or method worked best for communicating your idea, and why? - How might you adapt this process for your students (time, tools, complexity)?		

3.4. ACTIVITY 3.3: Share & Reflect — Make it Public

PROJECT N° 2024-2-SK01-KA210-SCH-000278989

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MODULE-3

Purpose of this Activity

This activity gives **teachers** the experience of preparing, presenting, and reflecting on circular solutions. By simulating a classroom “showcase,” teachers learn how to guide students in presenting prototypes, receiving feedback, and reflecting on their process. The focus is on **ownership, visibility, and real-world relevance**.

Materials Needed

- Poster paper, markers, or digital tools (Canva, Genially)
- Devices with camera/microphone for Flip or Loom
- Internet access for Padlet, Mentimeter, or Google Forms
- Peer feedback forms (paper or digital)

By the end of this activity, teachers will have:

- Presented their prototype or campaign in a chosen format
- Received structured feedback from peers
- Reflected on their own design and facilitation process

Step 3 – Collect Peer Feedback (approx. 10–15 min) Provide a peer-feedback form (paper or Google Form).

Prompts:

- One thing I liked most...
- One suggestion to improve...
- How the idea shows circular thinking...

Criterion	1 = Needs work	2 = Strong
Creativity	Idea is basic or not original	Idea is novel and engaging
Feasibility	Hard to apply in school context	Practical and realistic for school
Circular Connection	Weak or unclear link to 5Rs/CE	Clear link to 5Rs / circular economy principles

Step 1 – Prepare to Share (approx. 10–15 min)

Prepare a short presentation of your prototype or campaign. Choose a format:

- Flip video (2–3 minutes)
- Canva / Genially presentation
- Poster or physical model with oral explanation
- Mini-exhibit or Padlet entry **Include in your presentation:**
 - The problem addressed
 - The proposed idea and how it works
 - Which circular economy principles (5Rs, systems, redesign) it uses
 - The potential classroom/school impact

Step 2 – Present to an Audience (approx. 20–30 min)

Run a classroom-style **showcase**. Audience may include peers, other teachers, or trainers.

Suggested formats:

- Gallery walk (posters or prototypes)
- Digital showcase (Padlet wall, QR code posters, Flip video board)
- Short pitches (2–3 minutes each, with Q&A)

Step 4 – Reflect (approx. 15–20 min)

Individually reflect on the experience. Prompts:

- What did I learn about **sustainability and design**?
- What was the most challenging part of the project?
- What would I do differently next time?
- How could I adapt this activity for my **students**?

Formats: Google Doc, Flip video, Canva poster, or short oral sharing

Extension

Ask teachers to **tag each prototype** with a 5Rs strategy (Refuse, Reduce, Reuse, Repair, Recycle) and identify at least one related **SDG** (e.g., SDG 12 Responsible Consumption, SDG 13 Climate Action).

3.5. RUBRIC – Module 3: Designing Circular Solutions

Scoring: Each criterion 1–4 pts. Total = $\Sigma(\text{level} \times \text{weight})$.

Percentage = $(\text{Total}/4) \times 100$.

Criterion	Weight	1 – Beginning	2 – Developing	3 – Proficient	4 – Advanced
Problem Identification & Systems Thinking	20%	Identifies an issue in vague or isolated terms; no mapping.	Identifies an issue with some causes/impacts; limited connections.	Maps problem clearly with causes, impacts, and simple opportunities.	Demonstrates systemic view with leaks/loops and leverage points.
Lifecycle Mapping & Circular Redesign	20%	Lifecycle missing or incomplete; redesign absent.	Lifecycle mapped with gaps; redesign idea unrealistic.	Lifecycle mapped with key stages; redesign feasible.	Lifecycle mapped in depth; redesign clearly circular (reuse, repair, redesign).
PBL/DBL Process & Prototyping	30%	Limited or unclear use of PBL/DBL; no prototype.	Applies some PBL/DBL steps; prototype basic or unfinished.	Completes all steps with a working prototype.	Iterative use of PBL/DBL; prototype creative, tested, and refined.
Collaboration & Digital Tools	20%	Works individually; no or minimal use of tools.	Some collaboration; limited or basic digital tool use.	Effective collaboration; appropriate use of digital tools (e.g., Padlet, Canva).	Strong teamwork; creative integration of multiple digital tools.
Reflection & Action	10%	Reflection missing or generic.	Reflection present but vague or impractical action.	Reflection thoughtful with at least one realistic classroom action.	Deep reflection with multiple actions; clear plan for student adaptatio

Acceptable Evidence: Problem Map (causes–impacts–opportunities); Lifecycle diagram (linear vs. circular); Prototype artefact (poster, video, model, digital concept); Peer feedback form (from Activity 3.3); Reflection (written, recorded, or visual).

3.6. REFLECTION

Take a few minutes to reflect on what you learned in this module. You may write individually, discuss in pairs, or share in a group.

Guiding Questions:

1. What did you discover about material flows and waste systems in your school that you had not noticed before?
2. Which stage of the PBL/DBL cycle (problem definition, ideation, prototyping, sharing) was most challenging for you, and why?
3. How could you adapt one of the activities from this module for your subject area or age group?
4. What kind of impact could student-led circular projects have on your school community?

Optional – Student Adaptation

If you were to use these activities with students:

- What would you change (time, tools, or complexity)?
- How would you connect the activity to your curriculum goals?

3.7. QUIZ

1. Which of the following best describes the added value of combining Project-Based Learning (PBL) with Design-Based Learning (DBL)?

- A. PBL provides structure for real-world inquiry, while DBL ensures iterative design and reflection.
- B. PBL focuses on memorising facts, while DBL focuses on using technology.
- C. PBL and DBL are identical and interchangeable approaches.
- D. PBL requires only individual work, while DBL requires only teamwork.

Correct: A

2. In the “Mapping the Life of Materials” activity, what is the main purpose of tracing an object’s journey?

- A. To learn the manufacturing cost of school materials.
- B. To identify hidden causes, impacts, and opportunities for redesign.
- C. To practice drawing skills with diagrams.
- D. To compare different schools’ recycling policies.

Correct: B

3. Which of the following is the strongest example of a circular redesign idea?

- A. Replacing paper worksheets with reusable whiteboards.
- B. Buying more disposable pens to prevent shortages.
- C. Using plastic folders because they are cheaper.
- D. Throwing away broken markers more quickly.

Correct: A

4. During prototyping, why is “perfection” discouraged in the first version?

- A. Because schools do not allow polished products.
- B. Because an imperfect version invites feedback and further iteration.
- C. Because students cannot manage details.
- D. Because digital tools cannot create professional-quality outputs.

Correct: B

5. Which of the following reflections shows the deepest learning from the PBL/DBL cycle?

- A. “I enjoyed making a poster.”
- B. “It was difficult to use Canva.”
- C. “By mapping waste in the canteen, I realised small design changes could reduce food packaging.”
- D. “We finished the activity faster than expected.”

Correct: C

6. When students share their prototypes with a real audience (teachers, parents, community), the main educational benefit is:

- A. Making grading easier for the teacher.
- B. Reinforcing ownership, visibility, and real-world relevance.
- C. Reducing the need for reflection.
- D. Ensuring that all solutions will be implemented immediately.

Correct: B

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Green Loop Teacher Training Modules

Module 4

IMPLEMENTING CIRCULAR SOLUTIONS IN SCHOOLS

About the Modules

This five-part module series is designed to empower teachers with the knowledge, tools, and confidence to integrate circular economy principles into their teaching practice. Each module builds on the previous one, guiding educators from foundational understanding to the real-world application of circular solutions in school settings.

These learning modules have been developed as part of the Erasmus+ project “Green Loop” (Agreement No: 2024-2-SK01-KA210-SCH-000278989) under the **Key Action 2: Small-scale partnerships in school education (KA210-SCH)**.

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**The views expressed in this publication are those of the authors and project team, and the European Commission cannot be held responsible for any use which may be made of the information contained therein.*

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MODULE-4

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INTRODUCTION

Module 4 shifts the focus from designing circular solutions to putting them into action. In the earlier modules, teachers explored the foundations of the circular economy, systems thinking, and design-based learning. They also practised analysing problems, mapping material flows, and prototyping ideas. Building on this foundation, Module 4 emphasises how teachers can act as circular change agents within their schools and communities.

In this module, teachers will explore how to plan and lead campaigns, engage stakeholders, and create visible, lasting impact. They will learn how to guide students beyond classroom discussions into real-world action projects, where sustainability principles are applied in daily school life. Teachers will also practise documenting impact, collecting feedback, and celebrating achievements through showcase events.

The goal of this module is to equip teachers with the confidence, strategies, and tools to support meaningful change in their schools — while also modelling the skills and mindset of active citizenship and sustainability leadership. **In short, this module focuses on implementing circular solutions in schools through practical, collaborative, and community-based actions.**

MODULE 4- Implementing Circular Solutions in Schools

Aim

This module builds on Modules 1–3 by shifting from **prototyping** to **real-world implementation and outreach**. Teachers move from facilitating design thinking to **leading school-based action**—enabling campaigns, partnerships, and community engagement grounded in **circular economy** thinking. The module is aligned with the **UNESCO ESD Roadmap (2020)** and the **EU Circular Economy Action Plan (2020)** to connect classroom practice with wider policy priorities.

Learning Objectives

By the end of this module, teachers will be able to:

- Guide students to act as **circular economy** advocates and problem-solvers.
- Plan and implement **school-wide** sustainability actions using **SMART goals**.
- Map and collaborate with **stakeholders** (students, staff, families, local partners) to increase feasibility and impact.
- **Document and communicate impact** using creative and digital tools (e.g., before/after photos, brief interviews, surveys, showcase artefacts).
- **Evaluate** action-based projects with rubrics, peer/self-assessment, and reflection evidence; **iterate** next steps.

Core Content

Core topics you will explore in this module:

- Examples of **school-based action projects** (waste reduction, repair/reuse drives, resource-use campaigns).
- **Templates** for stakeholder mapping, campaign planning (with SMART targets), and simple evaluation.
- **Documentation & dissemination**: visuals, short videos, surveys, and showcase formats.
- **Peer and self-assessment** tools to support reflection and improvement.
- **Flexible timing**: approx. **3–4** classroom sessions **plus 1–2 weeks** for project implementation.

4.1. ACTIVITY 4.1: Map the Opportunity

Purpose of this Activity This activity helps teachers identify and analyse real sustainability problems in their school/community and uncover opportunities for circular economy action. Teachers experience the process now so they can later facilitate it with students. Materials Needed • Paper or large poster sheets • Pens, markers, sticky notes • Optional: Padlet, Jamboard/Miro, Google Slides, Flip • Optional: camera/phone (to document observed issues) By the end of this activity, teachers will have: • A visual sustainability map showing school-based problems and possible interventions • Identified key stakeholders and areas for improvement • Selected one focus area for action in the next phase	Step 1 – Scan Your School or Community (approx. 15 min) Explore school spaces to observe where sustainability problems exist. Possible areas: • Cafeteria (food waste, packaging) • Classrooms (paper use, energy waste) • Toilets (water usage) • Corridors (lighting, unused items) • Playground/garden (litter, biodiversity) Tip: Walk around and take notes/photos. If mobility is limited, use a guided observation or brief peer interviews	Step 2 – List the Problems (approx. 10 min) Create a shared list of observed problems (Padlet/Miro/whiteboard). Prompts: • Which resources are being wasted? • Which behaviours contribute to the problem? • Who is involved in this system?
	Step 3 – Build a Circular Opportunity Map (approx. 20 min) On paper or a digital board, place the chosen issue at the centre (e.g., School Cafeteria Waste). Around it, add: • Causes – What leads to this problem? • Impacts – Who/what is affected? • Stakeholders – Who uses or manages the space? • Opportunities – What could be changed or improved? Use arrows/colours to show links (systems thinking).	Step 4 – Prioritise One Action Area (approx. 10 min) As a group, decide on one area to focus on. Criteria: • Feasibility: Can action be taken in our school? • Relevance: Does it affect many people? • Impact: Could small changes create big results? Examples: reducing food-packaging waste, reusing supplies, uniform/book swap, fixing unused items.
Step 5 – Share and Document (approx. 5–10 min) Groups briefly share their maps and chosen focus area. Use Flip, posters, or Google Slides to document findings..	Reflection (approx. 5 min) • What surprised you most when mapping sustainability problems? • Which stakeholder group seemed most central, and why? • Which opportunity could have the biggest impact with the least resources? Optional Extension: Tag each opportunity with a 5Rs strategy and note any relevant SDG link (e.g., SDG 12, SDG 13).	

4.2. ACTIVITY 4.2: Campaign & Action Planning Lab

Purpose of this Activity This activity enables teachers to design a targeted, achievable, and creative circular-economy action or campaign that can be implemented in their school. Teachers experience the process now so they can later guide students through similar steps. Materials Needed • Campaign Planning Template (goal, audience, message, activities, timeline, roles) • Paper, sticky notes, pens/markers • Digital tools: Canva, Jamboard, Padlet, Flip, Google Forms • Access to school calendar (for realistic planning) By the end of this activity, teachers will have: • Defined a SMART goal for a school-based circular-economy initiative • Outlined a clear action plan with roles, timeline, and outreach strategies • Drafted initial campaign materials (visuals, tools) for awareness and engagement • Prepared to guide students in similar processes during classroom implementation	Step 1 – Revisit a Circular Economy Challenge (approx. 5 min) Reflect on the issue identified in Activity 4.1 (e.g., cafeteria waste, discarded supplies). Prompt: <i>“What exactly do I want to help change in my school context?”</i> Write one sentence describing a change objective.	Step 2 – Define the Campaign Goal (approx. 10 min) Formulate a SMART goal (<i>Specific, Measurable, Achievable, Relevant, Time-bound</i>). Examples: • “Reduce single-use plastics in the staffroom by 50% within one month.” • “Establish a reuse station with 100+ donated items by the end of term.” Complete the Campaign Planning Template with: • Campaign Goal • Target Audience (students, staff, parents) • Key Message • Proposed Activities • Timeline • Success Indicators • Assigned Roles
Step 3 – Brainstorm Campaign Activities (approx. 15 min) Generate creative outreach ideas (sticky notes, Jamboard, Canva). Guiding questions: • How can we make this campaign engaging and visible? • Can students contribute (videos, posters, performances)? • Which tools/media best fit our school context? Sample ideas: Poster series (“Sort It Right!”), Flip videos, pledge wall, “Repair Friday,” “No Waste Wednesday.”	Step 3 – Brainstorm Campaign Activities (approx. 15 min) Generate creative outreach ideas (sticky notes, Jamboard, Canva). Guiding questions: • How can we make this campaign engaging and visible? • Can students contribute (videos, posters, performances)? • Which tools/media best fit our school context? Sample ideas: Poster series (“Sort It Right!”), Flip videos, pledge wall, “Repair Friday,” “No Waste Wednesday.”	Step 5 – Finalise the Action Plan (approx. 10 min) Finalise the campaign plan using the template and prepare for presentation. Check that: • Timeline is feasible • Materials are practical/adaptable • Message is clear and linked to the mapped problem
	Reflection (approx. 5 min) • Which part of campaign planning felt easiest, and which most challenging? • How might this campaign create visible change in your school? • What could make the campaign more engaging for your community? Extension Tag your campaign goal with a 5Rs strategy (Refuse, Reduce, Reuse, Repair, Recycle) and link it to at least one SDG (e.g., SDG 12 Responsible Consumption, SDG 13 Climate Action).	

4.3. ACTIVITY 4.3: Stakeholder Role-Play and Engagement

Purpose of this Activity This activity equips teachers with the skills to identify key school stakeholders, anticipate their concerns, and practise presenting circular economy initiatives in a convincing and strategic manner. Materials Needed - Stakeholder Mapping Template (optional) - Paper, pens, sticky notes - Timer (for role-play) - Digital tools: Canva (slides/posters), Flip (short pitch videos) By the end of this activity, teachers will have: - Mapped relevant stakeholders for a school-based circular economy action - Developed a concise and targeted stakeholder pitch - Simulated a realistic stakeholder interaction to refine communication and negotiation skills - Reflected on feedback to strengthen their action proposal	Step 1 – Identify Key Stakeholders (approx. 10 min) Reflect on the campaign or action from Activity 4.2. List individuals or groups whose support is critical. Examples: - School principal or deputy head - Facilities or cleaning coordinator - Parent–Teacher Association (PTA) - Student council - Local environmental officer or municipality contact - Subject colleagues (science, arts, technology) <i>Prompting questions:</i> - Who is directly or indirectly affected by this initiative? - Who controls the resources (space, time, materials) I need? - Who might resist or be hesitant — and why?	Select one stakeholder group and draft a 2–3 minute pitch that addresses: - The problem and its relevance - The proposed circular economy solution - The expected impact on the school or wider community - The specific support or permission being requested (and what you will provide in return, e.g., updates, data, visuals)
Step 3 – Simulate the Stakeholder Meeting (approx. 15–20 min) Work in pairs or small groups. - One teacher presents their pitch. - Others act as stakeholders, asking realistic questions or raising concerns (e.g., costs, sustainability, safety). <i>Tip: Use a timer and encourage constructive but honest responses.</i>	Reflection (approx. 5 min) - Which stakeholder perspective was most challenging to address? - What communication strategies helped make the pitch persuasive? - How might you involve stakeholders more effectively in your school context? Optional Extension - Add a one-page brief (goal, timeline, roles, success indicators) to send after the meeting. - Record a 30–60s Flip elevator pitch tailored to this stakeholder. Acceptable Evidence Stakeholder list/map; pitch artefact (slide/poster/script/video); brief reflection (3–4 sentences).	

4.4. Activity 4.4 – Take Action & Document the Impact

Purpose of this Activity This activity supports teachers in implementing their planned circular economy action/campaign within their school context and reflecting on its outcomes, challenges, and overall impact. Materials Needed • Campaign materials (posters, signage, digital tools, survey forms) • Camera or phone (for photos/videos) • Campaign Day Checklist (setup, logistics, observation, clean-up) • Digital tools: Google Forms, Mentimeter, Padlet, Flip, Canva, Google Slides By the end of this activity, teachers will have: • Implemented their planned circular economy action/campaign • Collected documentation and feedback from their school environment • Reflected on the implementation process and its effects • Organised materials to share outcomes with others	Step 1 – Final Preparation (approx. 10–15 min) Revisit and finalise action materials and timeline. Checklist: • Are posters, forms, and digital tools ready? • Are roles clearly assigned? • Has the school audience been informed? Tip: Prepare a “Campaign Day Checklist” including setup, photo/video capture, peer/student observation, and clean-up.	Step 2 – Implement the Action or Campaign (approx. 1–2 weeks) Carry out the planned campaign in the school. Example campaign types: • “Zero-Waste Week” in classrooms or staffrooms • Uniform/material reuse station • Poster or video exhibition • Pledge or survey collection • Sorting bin station with clear signage Documentation tools: photos (before/after), short interviews, daily logs, QR codes, Flip reflections.
Step 5 – Prepare Summary Materials (Optional, approx. 10–15 min) Consolidate evidence and reflections to communicate outcomes. Output options: • One-slide impact summary (Canva/Google Slides) • Infographic with data and photos • Video compilation or blog post • Newsletter article or display board	Step 3 – Collect Feedback & Monitor Results (approx. 10–20 min) Gather feedback and simple data to assess reach and impact. Suggested tools: Google Forms, printed surveys, Mentimeter, Padlet. Prompts: • What stood out in the campaign? • What could be improved? • Did this activity shift sustainability thinking? Step 4 – Reflect on the Process (approx. 15–20 min) Reflect individually and collectively. Questions: • What worked well? • What challenges occurred? • What did I learn about planning and leadership? • Did I observe changes in awareness/behaviour? • What would I improve next time? Suggested formats: journal entry (Google Docs), Flip video diary, infographic/photo story. Reflection (approx. 5 min) • What did I learn about my own role as a change agent? • How did documenting the campaign affect my understanding of its impact? • Which communication format (poster, video, infographic, etc.) was most effective for sharing results? Acceptable Evidence • Campaign Day Checklist (with roles, timeline) • Photos/videos (before & after) • Feedback survey results (Forms/Mentimeter/Padlet) • Reflection (written note, Flip video, infographic/photo story) • Impact summary (poster, slide, or newsletter article)	

4.5. ACTIVITY 4.5 – Circular Change Agent Showcase

Purpose of this Activity This activity supports teachers to organise a showcase where students present the outcomes of their circular economy projects to the wider school community, collect feedback, and celebrate learning. Materials Needed • Student project outputs (posters, models, videos, presentations) • Certificates for recognition (template with student name, project title, dates, thank-you note) • Feedback tools: comment cards, dot-voting sheets, Padlet, Mentimeter • Space setup: classroom, hall, or digital exhibition platform By the end of this activity, teachers will have: • Guided students in preparing final presentation materials • Organised a showcase event adapted to their school context • Facilitated community involvement and feedback collection • Reflected on strategies to scale or sustain student-led actions	Step 1 – Teacher Facilitation & Planning (variable prep time) • Decide the event format and logistics (gallery walk, short pitches, digital wall). • Guide students in selecting/creating final showcase products. • Prepare the space, materials, and/or digital platforms.	Step 2 – Student Participation & Presentation (event duration) Students take the lead: • Present their circular economy projects. • Share key results and reflections. • Receive feedback and recognition.
Step 3 – Feedback & Celebration (approx. 15–20 min) Provide multiple ways for audience feedback: • Comment cards, dot voting (“Most Creative”, “Biggest Impact”), Padlet wall, or Mentimeter. • Distribute Circular Change Agent Certificates personalised with: student’s name, project title, dates of implementation, a short thankyou statement.	Step 4 – Reflect on What Comes Next (approx. 10–15 min) Facilitate a brief group discussion: • What project would you continue or expand if more time were available? • How can we sustain the impact into the next term/semester? • What advice would you give to the next group of students?	Acceptable Evidence Showcase agenda; photos/video from the event; sample feedback (cards, Padlet/Mentimeter export); certificate template; short teacher reflection (3–5 sentences). Optional Extension Invite a local partner (municipality, NGO, repair café) as a guest reviewer; tag each project with a 5Rs strategy and at least one SDG connection (e.g., SDG 12, SDG 13).

4.6. Rubric – Module 4: Acting as Circular Change Agents

Scoring: Each criterion 1–4 pts. Total = $\Sigma(\text{level} \times \text{weight})$.

Percentage = $(\text{Total}/4) \times 100$.

Criterion	Weight	1 – Beginning	2 – Developing	3 – Proficient	4 – Advanced
Stakeholder Mapping & Analysis	20%	Identifies few or irrelevant stakeholders; no analysis.	Lists some stakeholders with limited roles/links.	Maps key stakeholders with roles and relevance.	Comprehensive mapping with power/influence links; anticipates concerns.
Campaign Planning & SMART Goals	20%	Goal vague/unspecific; no plan.	Sets a partial goal; plan incomplete.	Defines a SMART goal with a feasible plan.	Goal is SMART, creative, measurable; plan detailed and realistic.
Implementation & Documentation	30%	Action not carried out or undocumented.	Action carried out partially; limited documentation.	Action implemented; evidence collected (photos, surveys).	Implementation well organised; rich documentation (before/after, feedback, artefacts).
Collaboration & Communication	20%	Works individually; no communication strategy.	Some teamwork; basic communication.	Effective teamwork; clear communication (posters, videos).	Strong teamwork; persuasive communication tailored to stakeholders/audience.
Reflection & Future Action	10%	No reflection; no next steps.	Reflection vague; limited ideas for next steps.	Thoughtful reflection; at least one realistic next action.	Deep reflection; multiple next steps; clear plan for sustaining impact.

Acceptable evidence: Stakeholder map; campaign planning template; implementation photos/videos; survey/feedback results; showcase artefacts (posters, slides, videos); teacher/student reflections.

4.7. REFLECTION

Take a few minutes to reflect on your learning and practice in this module. You may write individually, discuss in pairs, or share in a group.

Guiding Questions

1. What did I learn about my role as a teacher in supporting students to become *circular change agents*?
2. Which activity (mapping, campaign planning, stakeholder engagement, implementation, showcase) gave me the deepest insight into sustainability education?
3. What challenges did I experience when moving from *planning* to *taking action*?
4. How did engaging with stakeholders and the wider school community affect the process and outcomes?
5. What strategies could I use to make these kinds of actions more sustainable and long-lasting in my school?

Optional – Student Adaptation

If you plan to adapt these activities for your classroom:

- Which parts would you simplify or shorten for your students' age group?
- How would you connect the showcase or campaign to curriculum goals?
- What kind of support would students need to succeed as change agents?

4.8. QUIZ

1. What is the main difference between “acting as a circular change agent” (Module 4) and the earlier design-focused modules?

- A) Module 4 focuses on hands-on prototyping of classroom tools.
- B) Module 4 emphasises implementation, outreach, and community engagement.
- C) Module 4 is about memorising theoretical concepts.
- D) Module 4 only involves digital design activities.

Correct: B

2. Which of the following is the strongest example of a SMART campaign goal?

- A) “Encourage everyone to recycle more.”
- B) “Reduce paper use by half within two months in the staffroom.”
- C) “Make our school more sustainable.”
- D) “Promote awareness of circular economy.”

Correct: B

3. Why is stakeholder mapping important in school-based circular economy actions?

- A) It ensures students do not take part in planning.
- B) It identifies who controls resources, who is affected, and who may resist.
- C) It allows teachers to avoid asking for support from the principal.
- D) It focuses only on external partners outside the school.

Correct: B

4. During campaign implementation, which of the following is the best documentation practice?

- A) Keeping only mental notes of what happened.
- B) Collecting before/after photos, short video interviews, and feedback surveys.
- C) Avoiding feedback to reduce criticism.
- D) Only using social media likes as evidence.

Correct: B

5. In the Circular Change Agent Showcase, why is feedback collection from the audience essential?

- A) It allows teachers to grade students more easily.
- B) It validates student efforts and provides insights for improvement.
- C) It ensures all projects receive the same score.
- D) It replaces reflection activities.

Correct: B

6. Which reflection question best demonstrates a teacher's growth as a change agent?

- A) "Did the projector work during the showcase?"
- B) "How did engaging with stakeholders change the outcome of the project?"
- C) "Was my event longer than expected?"
- D) "How many posters were printed?"

Correct: B

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Green Loop Teacher Training Modules

Module 5

INCLUSIVE DESIGN FOR CIRCULAR CLASSROOMS

About the Modules

This five-part module series is designed to empower teachers with the knowledge, tools, and confidence to integrate circular economy principles into their teaching practice. Each module builds on the previous one, guiding educators from foundational understanding to the real-world application of circular solutions in school settings.

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INTRODUCTION

Module 5 shifts the focus to inclusivity and accessibility in circular economy education. Building on the foundations of Modules 1–4 (5Rs, systems thinking, DBL/PBL, action & outreach), this module helps teachers design and adapt lessons so that all learners — including those with diverse needs and disadvantaged backgrounds — can participate meaningfully in sustainability education.

The emphasis is on **Universal Design for Learning (UDL)** as a framework for planning, teaching, and assessment. Teachers will explore practical strategies to reduce barriers, provide multiple ways for students to access content, express their learning, and stay engaged in circular projects. Through hands-on activities, collaboration, and reflection, teachers will practise integrating circular economy concepts into existing curricula while ensuring equity and inclusion. They will design lessons, co-develop with peers, map barriers to strategies, and pilot their approaches in classrooms. The goal of this module is to empower teachers to become **inclusive educators for circular classrooms** — able to create learning environments where every student can develop the skills, knowledge, and mindset needed to contribute to a sustainable future.

MODULE 5: Inclusive Design for Circular Classrooms

Aim

This module enables teachers to **adapt circular economy learning** for **diverse and disadvantaged learners** using **Universal Design for Learning (UDL)**. Building on Modules 1–4 (5Rs, systems thinking, DBL/PBL, action & outreach), it focuses on **planning, adapting, and evidencing** lessons so that **all learners** can access content, **express learning in multiple ways**, and **engage meaningfully** in circular projects.

Learning Objectives

By the end of this module, teachers will be able to:

- Map **barriers to learning** (language, cognition, access, context) and select **UDL-aligned adaptations** for circular economy tasks.
- Design lessons that provide **multiple means of representation, action/expression, and engagement** (UDL 3.0+).
- **Differentiate** circular activities (5Rs, systems maps, prototyping, campaigns) for **ELL/SEN** and other disadvantaged learners.
- Create **accessible materials** (readability, visuals/alt text, captions) and plan **assessment options** (choice of product/process evidence).
- Use **quick evidence tools** (checklists, exit tickets, mini-rubrics) to evaluate inclusion and **iterate** lesson design.

Core Content

Core topics explored in this module include:

- **UDL essentials for circular learning:** Multiple Representation, Action/Expression, Engagement (with classroom examples).
- **Barrier-to-Strategy mapping:** common barriers (literacy, language, executive function, sensory/motor, prior knowledge) → **practical adaptations** for 5Rs, systems maps, DBL/PBL.
- **Accessible materials & environments:** plain language, visuals/icons, **alt text/captions**, layout/colour contrast, peer support, low-tech/high-tech options.
- **Differentiation & choice:** tiered tasks, scaffolded templates, **product/process choice** (poster, model, Flip video, oral brief, bilingual glossary).
- **Assessment for learning (AFL):** quick checks, **mini-rubrics**, success criteria in student-friendly language; using feedback to **iterate** designs.
- **Subject exemplars:** adapting **science, maths, language arts, arts/technology** lessons for circular economy tasks with UDL.

5.1. From Theory to Practice: Curriculum Integration with UDL

Core idea. Circular economy is not an extra subject; it's a **lens** to enrich existing curricula. Using **Universal Design for Learning (UDL)**, teachers across subjects can ensure **access, expression, and engagement** for diverse and disadvantaged learners.

Across-Subject Examples (with UDL prompts)

- **Science** – Energy, ecosystems, material cycles.
Task: Compare biodegradable vs plastic.
UDL: Dual-code results (table + diagram); allow **oral/video** reports; **sentence starters** for ELL.
- **Mathematics** – Waste/energy data.
Task: Graph school recycling rates.
UDL: Offer **graph choices**; scaffolded data cards; **screen-reader-friendly** sheet.
- **Art & Design** – Reuse/repurpose.
Task: Design with reclaimed materials.
UDL: **Choice of product** (poster/model/video); visual rubric; option for quiet/paired work.
- **ICT & Technology** – Tools for sustainable habits.
Task: Prototype sorting-bin signage/app.
UDL: **Template wireframes**; accept **paper prototypes**; captions/alt text.
- **Social Studies/Citizenship** – Consumer behaviour, civic action. *Task:* Map stakeholders; brief the PTA.
UDL: **Graphic organiser**; bilingual glossary; **role-play or written** brief.
- **Languages** – Persuasive communication.
Task: Compose a campaign pitch.
UDL: **Model texts + checklist**; **audio/Flip** option; vocabulary bank.

SDG Links

Make links explicit to **SDG 12**, **SDG 13**, and **SDG 4.7 (ESD)** so learners see how classwork connects to global challenges.

UDL Principles (plan for...)

- **Representation:** infographics, short videos, concrete objects.
- **Action & Expression** written/oral/visual options; prototypes; bilingual choices.
- **Engagement:** task/product choice; real-world relevance; peer support.

5.2. UDL Quick-Start Grid for Circular Classroom Tasks

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This grid offers teachers practical strategies to adapt common circular-economy learning tasks so that all learners (including ELL, SEN, or disadvantaged backgrounds) can participate meaningfully.

Use it as a reference when planning or adapting lessons.

Circular Task	Multiple Means of Representation (What & How learners access content)	Multiple Means of Action & Expression (How learners show learning)	Multiple Means of Engagement (How learners stay motivated & included)
5Rs Mini-Project	- Icon cards for each R (Refuse–Reduce–Reuse–Repair–Recycle) - Short video/infographic examples - Bilingual glossary	- Poster, Flip video, or short speech - Digital storyboard (Canva/Genially) - Draw & label flow diagram	- Group choice of which “R” to focus on - Real-life school examples - Peer mentoring pairs
Systems Map	- Colour-coded arrows/icons - Template maps with sentence starters - Example diagram to model thinking	- Paper map, Jamboard, or Miro version - Oral walkthrough (recorded) - Label with keywords or images	- Role assignment (mapper, explainer) - Gamified: spot “loops/leaks” challenge - Compare school vs. community
Prototype (DBL/PBL)	- Step-by-step photo guide - Scaffold template (input–process–output) - Example prototypes from peers/online	- Cardboard model, Canva poster, or Scratch animation - Oral pitch + sketch - Annotated photo of model	- Option to work solo/pair/group - Choice of product type (poster/model/digital) - Showcase in safe, supportive space
Campaign Pitch	- Model scripts + sentence frames - Example visuals (banners, slogans) - Short campaign video as model	- Flip video, Canva slide deck, or role-play speech - Infographic or comic strip - Written pledge form	- Audience choice (classmates, parents, PTA) - Dot-voting for best idea - Social media-style Padlet wall
Showcase / Reflection	- Checklist + visual rubric - Peer exemplar (what “good” looks like) - Graphic organiser for reflection prompts	- Written note, Flip reflection, poster collage - Oral group debrief - Infographic “My 3 lessons learned”	- Peer feedback circles - Dot-voting (“Most Creative”, “Biggest Impact”) - Certificate of recognition

5.3. ACTIVITY 5.1: Design Your Own Circular Economy Lesson

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Purpose of this Activity This activity supports teachers in designing curriculum-linked lessons that integrate circular economy principles (e.g., reduce, reuse, repair, redesign) and adapt them inclusively using Universal Design for Learning (UDL). Teachers will practise embedding sustainability into their subject areas while ensuring that diverse learners can access, express, and engage. Materials Needed - Lesson planning template (provided or teacher-created) - Access to digital tools (Google Slides, Canva, Padlet, Jamboard, Flip, Miro) - Curriculum standards or unit outlines By the end of this activity, teachers will have: - A developed lesson or activity aligned with circular economy values - A clear, measurable learning objective linking subject and sustainability goals - A structured, shareable prototype (e.g., slide deck, worksheet, Padlet board) - Documented UDL strategies for representation, action/expression, and engagement - Reflections on inclusion, challenges, and next steps for implementation	Step 1 – Choose Your Subject & Topic (10 min) Select a subject/unit that connects to circular economy ideas. Examples: - Science → Waste, ecosystems, materials - Art → Product design, recycled sculpture - Social Studies → Consumption, local economies - ICT → App for waste tracking or sustainable habits UDL Tip: Ask: <i>Which learners might face barriers here (language, prior knowledge, access)?</i> Note possible adaptations.	Step 2 – Select a Circular Economy Theme (5 min) Pick one or more guiding themes: Reduce · Reuse · Repair · Redesign · Refuse. Or use broader frameworks (e.g., Butterfly Diagram, Doughnut Economics). UDL Tip: Provide visual icons or examples for each theme so all learners can access them.
Step 3 – Define Your Learning Objective (10 min) Write a measurable objective that covers subject knowledge and inclusivity. Examples: “Students will analyse the lifecycle of a product and propose a more circular alternative, using visuals or oral explanation.” “Students will prototype a reusable item and present it through poster, model, or Flip video.” UDL Tip: Always offer multiple evidence formats for students to show success.	Step 4 – Plan the Activity Structure (15 min) Prompts: - Duration → 1 lesson / multi-day project - Format → Individual / Pair / Group - Tools → Canva, Jamboard, Poster, Flip - Outcome → Poster, Prototype, Presentation, Campaign - Assessment → Rubric, Peer/self feedback, choice of evidence (poster/video/oral reflection) - Inclusion → Plan adaptations for ELL/SEN (visual scaffolds, sentence starters, group roles, glossary, captioned video) - Real-world link → Who will benefit or see the work?	Step 5 – Prototype & Share (20 min) Create a draft lesson/activity. Include: - Title & objective - Materials needed - Student instructions - Expected outputs (with options for UDL expression) - Assessment strategy (rubric + feedback tools) Accessibility Check: Is the language clear? Are visuals captioned/labelled? Can students use multiple formats (poster, oral, video)?
Reflection (5 min) - What was most challenging in planning inclusively? - How does my lesson apply circular economy principles?	- How will SEN/ELL learners participate meaningfully? - What real-world impact could this activity create?	

5.4. ACTIVITY 5.2: Co-Design and Peer Feedback Lab

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Purpose of this Activity This activity helps teachers refine their circular economy lesson plans through collaboration. By sharing prototypes, giving UDL-focused feedback, and revising, teachers make their activities more practical, engaging, and inclusive. Materials Needed - Draft lesson prototypes (slides, Padlet, worksheet, etc.) - Peer Feedback Form (checklist or rubric provided) - Digital tools: Padlet, Jamboard, Google Docs, Flip By the end of this activity, teachers will have: - Shared their lesson prototypes with peers - Received structured feedback on clarity, impact, and inclusion - Revised their lesson plans for stronger UDL alignment and realworld relevance	Step 1 – Share Your Prototype (10 min) Present your draft lesson design to a small group or partner. Format options: - Padlet wall of lesson ideas - Quick 2-minute Flip video - Live sharing with slides or posters	Step 2 – Give and Receive Feedback (15 min) Peers use a feedback form or checklist. Prompts: - One thing that works well - One area for improvement - One suggestion to make it more inclusive (UDL lens) UDL Guiding Questions: Representation: Is the content presented in more than one way (e.g., visual + text)? Action & Expression: Can students show learning through different formats (poster, oral, video)? Engagement: Are there options for choice, relevance, or peer support?
Step 3 – Revise Your Lesson Plan (15 min) Reflect on peer feedback and adjust your design. Focus on: - Clarity of instructions - Feasibility in the classroom Inclusivity and UDL adaptations - Student engagement and real-world link	Reflection (5 min) - What was the most useful feedback I received? - What change did I make that strengthened UDL in my plan? - How confident do I feel about trying this in my classroom?	

5.5. ACTIVITY 5.3: Barrier → Strategy Mapping

Purpose of this Activity

This activity equips teachers to anticipate barriers that diverse learners (e.g., ELL, SEN, disadvantaged backgrounds) may face in circular economy lessons and plan concrete strategies to overcome them. By completing the Barrier → Strategy Map, teachers ensure that learning tasks are accessible, inclusive, and motivating for all students.

Materials Needed

- Barrier → Strategy Mapping template (table format)
- Lesson plan draft from Activity 5.1/5.2
- Pens, sticky notes, or digital tools (Padlet, Jamboard, Google Docs) **By the end of this activity, teachers will have:**
 - Identified likely barriers to access, expression, and engagement in their lesson
 - Matched each barrier with at least one UDL-aligned strategy
 - Produced a practical adaptation plan to make their lesson more inclusive

Step 1 – Identify Potential Barriers (10 min)

Review your lesson plan. Ask:
Who might struggle, and why?

Examples of barriers:

- Representation:**
Complex text, lack of visuals, language difficulty
- Action & Expression:**
Only written tasks, no alternative formats
- Engagement:** Limited choice, abstract content with no real-life link

Step 2 – Map to Strategies (15 min)

For each barrier, list one or more strategies.

Examples:

Barrier	Strategy (UDL)	Example in Circular Economy Lesson
ELL student struggles with technical vocabulary	Provide bilingual glossary & icons	Add glossary with visuals to “5Rs” worksheet
SEN student with fine motor challenges	Offer digital or oral expression options	Allow Flip video instead of handwritten poster
Low motivation due to abstract content	Link task to real school issue	Use canteen waste data for maths graphing activity

Step 3 – Share and Compare (10 min)

Exchange maps with peers. Discuss:

- Which strategies are realistic in your context?
- Which adaptations could benefit all learners, not only those with identified needs?

Step 4 – Reflection (5 min)

- Which barrier was easiest to plan for? Which most challenging?
- Which adaptation could I implement immediately in my classroom?
- How might this mapping process change the way I design lessons in the future?

5.6. Pilot Implementation Guide

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Phase 1 – Preparation (1–2 weeks before)

Teacher actions:

- Select one activity from Module 5 (e.g. 5.1 Design Your Own Circular Economy Lesson).
- Adapt to subject, grade, and curriculum.
- Prepare materials (worksheets, slides, Padlet/Canva, rubric, reflection prompts).
- Arrange logistics (room, groups, devices). **Observer/colleague actions:**
- Receive lesson plan + observation form.
- Focus on clarity, pacing, engagement, inclusion, and circular economy links.

Phase 2 – Pilot Delivery (90 min suggested)

1. **Introduction (10–15 min):** Present lesson goals, curriculum links, and circular economy principles (5Rs, systems thinking, redesign).
2. **Core Activity (45–55 min):** Students complete the designed task (e.g. lifecycle map, redesign challenge). Teacher facilitates and supports SEN/ELL students. Observer notes participation, timing, inclusivity.
3. **Sharing & Peer Feedback (10–15 min):** Groups present outputs (poster, model, slide, Flip). Peer feedback:
 - One strength
 - One improvement
 - One real-world application
4. **Reflection & Wrap-up (10–15 min):** Exit ticket, Padlet wall, or oral discussion. Sample prompts:
 - What did you learn about waste or redesign?
 - What was most challenging?
 - How might this idea impact our school?

Phase 3 – Data Collection

Observer: Use checklist for instructions, engagement, group work, circular links, inclusion, time use.

Teacher: Collect work samples (photos, posters, digital files). Use quick feedback tools (Google Form, exit slips, peer sheets).

Phase 4 – Post-Pilot Reflection (within 48h)

Teacher journal prompts:

- Did students meet the objectives?
- Which parts were most/least effective?
- Were SEN/ELL students engaged?
- What changes would I make next time?

Observers debrief (3–2–1 method):

- 3 strengths
- 2 areas for improvement
- 1 suggestion for redesign

Phase 5 – Evaluation & Revision (within 1 week)

- Revise the lesson based on student work, self-reflection, and observer feedback.
- Document changes: “What I adjusted and why.”
- Prepare a short Pilot Report (2–3 pages) including:
 - Aim of pilot
 - Class description (subject, grade, size)
 - Key findings (engagement, outcomes, challenges)
 - Adjustments for next iteration
 - Evidence (photos, quotes, samples)

Optional extension: Share revised lesson in Peer Lab (Activity 5.2) or upload to school repository.

*This pilot implementation process is aligned with the **Lesson Plan Analysis Protocol (LPAP)** developed by Ndiokubwayo et al. (2022). LPAP is a validated tool consisting of 27 criteria across planning, implementation, and evaluation stages, including **Special Educational Needs (SEN)**, **formative assessment**, and **active learning**.*

*Teachers and observers may choose to use the **LPAP Evaluation Form** as a structured checklist during or after the pilot. This can complement the observation notes and selfreflection prompts by providing a more standardised way to document lesson quality, inclusivity, and alignment with curriculum goals.*

5.7. LPAP Simplified Checklist (for Pilot Lesson Observation)

Section	Focus Area	Criteria	✓	~	X	
Preliminaries	Lesson preparation	Lesson has clear title & objectives				
		Links to curriculum & SDGs stated				
		Materials/resources ready				
		Timing & sequencing realistic				
	Inclusion & readiness	SEN/ELL needs anticipated				
		UDL strategies noted (representation, expression, engagement)				
		Prior knowledge considered				
Body	Introduction	Motivation / real-world link				
		Clear, accessible instructions				
		Success criteria explained				
	Core teaching & learning	Active learning (group, inquiry, hands-on)				
		Teacher facilitates, not only lectures				
		Questions check understanding				
		Digital/visual tools where appropriate				
		Circular economy links explicit (5Rs, systems, redesign)				
		Differentiation	Multiple entry points for ability levels			
			Scaffolds provided (sentence starters, visuals, glossary)			
	Choice in product or process					
	Assessment for learning	Ongoing feedback given				
		Peer/self-assessment used				
		Process & product both checked				
Accessories	Classroom climate	Participation encouraged for all				
		Respectful, collaborative atmosphere				
		Time on task observed				
	Closure & reflection	Lesson ends with summary/reflection				
		Exit ticket, discussion, or Padlet used				
		Students connect learning to real-world sustainability				
	Documentation	Teacher collects student work samples				
		Observer notes clarity, engagement, inclusion, circular content				
*✓sufficient	~ partial	X missing				

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5.8. Rubric – Module 5: Inclusive Design for Circular Classrooms

Scoring: Each criterion scored 1–4.

Total = $\Sigma(\text{level} \times \text{weight})$. Percentage = $(\text{Total} / 4) \times 100$.

Criterion	Weight	1 – Beginning	2 – Developing	3 – Proficient	4 – Advanced
Circular Economy Integration	20%	Lesson shows little/no link to circular concepts	Mentions circular ideas but weakly linked to subject	Clear link between subject and circular concepts (5Rs, systems, redesign)	Strong integration across subject & CE principles with real-world connections
UDL Application	25%	No adaptations; onsize-fits-all	Some UDL strategies noted but limited	UDL used for representation, expression, engagement with basic adaptations	Comprehensive UDL strategies applied; proactive barrier removal for diverse learners
Barrier → Strategy Mapping	15%	Barriers not identified	One or two barriers listed, limited strategies	Key barriers identified with feasible strategies	Full mapping of barriers with creative, practical strategies for inclusion
Lesson Prototype & Tools	20%	Prototype missing or unclear; tools inappropriate	Prototype incomplete; limited use of digital/visual tools	Working prototype with appropriate tools (Canva, Padlet, Flip etc.)	Refined prototype, creative tool use; clearly accessible materials (alt text, captions, glossaries)
Peer Feedback & Revision	10%	No feedback sought; no revisions made	Feedback noted but little applied	Feedback used to make meaningful improvements	Feedback fully integrated; lesson strengthened with evidence of impact
Reflection & Next Steps	10%	No reflection	Reflection vague; no concrete next step	Clear reflection with one next step	Deep reflection; multiple actionable steps for classroom practice

***Acceptable Evidence:** UDL-adapted lesson plan - Lesson prototype (poster, Padlet, Flip, worksheet) -Peer feedback form (Activity 5.2)-Barrier → Strategy Map (Activity 5.3)-

Accessible material sample -Teacher reflection note or Flip video

5.9. REFLECTION

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Take a few minutes to reflect on your learning in this module. You may write individually, discuss in pairs, or share in a group.

Guiding Questions

1. What did I learn about using **UDL** to make circular economy lessons inclusive for all learners?
2. Which adaptation (representation, expression, or engagement) do I feel most confident applying?
3. What was most challenging about identifying **barriers and strategies**?
4. How could I adapt one of my existing lessons to better include SEN/ELL students?
5. What immediate change will I try in my classroom next month to make learning more equitable?

Optional – Student Adaptation

If you plan to adapt these activities for your students:

- Which UDL strategies would you prioritise first?
- How would you explain inclusivity and circular economy concepts in student-friendly language?
- What support would your students need to succeed as circular thinkers?

5.10. QUIZ

1. Which of the following best defines the role of UDL in circular economy education?

- A) To create a separate curriculum for SEN/ELL students
- B) To ensure access, expression, and engagement for all learners through flexible design
- C) To simplify lessons so only the basics are taught
- D) To focus exclusively on digital tools

Correct answer: B

2. A teacher asks students to present redesign ideas either as a poster, Flip video, or oral pitch. This is an example of:

- A) Multiple Means of Representation
- B) Multiple Means of Action & Expression
- C) Multiple Means of Engagement
- D) Assessment of Learning

Correct answer: B

3. Which barrier–strategy match is most accurate?

- A) ELL student struggles with vocabulary → provide bilingual glossary and icons
- B) Low motivation → ask students to memorise definitions
- C) SEN student with motor challenges → insist on handwriting the poster
- D) Time constraint → skip peer feedback entirely

Correct answer: A

4. In Activity 5.2, why is peer feedback valuable?

- A) It allows grading without teacher effort
- B) It strengthens lesson plans through collaboration and inclusivity checks
- C) It replaces teacher reflection
- D) It avoids addressing SEN/ELL needs

Correct answer: B

5. Which of the following reflections shows deep application of UDL?

- A) "I added more text to my slides."
- B) "I realised some learners needed visuals and oral options, so I created both."
- C) "The activity was shorter than expected."
- D) "Students enjoyed the group work."

Correct answer: B

6. Why is Barrier → Strategy Mapping important?

- A) It ensures lessons are identical for all students
- B) It helps anticipate challenges and plan adaptations proactively
- C) It eliminates the need for digital tools
- D) It is only relevant for advanced learners

Correct answer: B

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